

AI296™ 16-Port High Speed Multi-Protocol Line Card User's Guide

Version 9.8x



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About this Document

This document explains how to install, configure, and operate the AI296 16-port high speed multi-protocol line card.

You should have a working knowledge of the following:

- Your network
- AISwitch™ technology
- X.25 protocol
- Asynchronous protocols
- TCP/IP
- PC or asynchronous terminal configuration

Document Conventions

[Table 1](#) describes the text conventions used in this document.

Table 1 Document Conventions





Convention	Meaning
Screen Text, Menu Items, System Prompts, Messages and Reports	This style indicates Kentrox configuration screen text, menu items, system prompts, messages, and reports.
Static Command Text	In a command statement, this style indicates text that should be entered exactly as shown at a command line.
<i>Variable Command Text</i>	In a command statement, this style indicates user-specified text.
...	In a command statement, ellipses (. . .) signify that the preceding parameter can be repeated a number of times.
[] []	In a command statement, square brackets indicate an optional parameter. Two or more parameters in square brackets with a vertical bar () between them indicate a choice of optional parameters.
{ }	In a command statement, two or more parameters in braces with a vertical bar () between them indicate a choice of required parameters.
<i>Variable Field Text</i>	This style indicates variable information you type in a dialog box field.
KEYS	Uppercase body text indicates keys on a keyboard, such as the TAB or ENTER keys. Keys used in combination are connected with a plus symbol (+).
Labels	This style designates physical components on Kentrox products such as jumpers, switches, and cable connectors.
 Note:	Note messages emphasize or supplement important points of the main text.
Important:	Important messages provide information that is essential to the completion of a task.
 Tip:	Tip messages provide information that assists users in operating equipment more effectively.



Table 1 Document Conventions (Continued)

Convention	Meaning
 CAUTION:	Caution messages indicate that failure to take a specified action could result in loss of data and/or harm to the software or hardware.
 WARNING:	Warning messages indicate that failure to take a specified action could result in physical harm to the user.

Cautions and Warnings

Electrostatic Discharge Caution



CAUTION: Kentrox equipment and its peripherals contain electrostatic sensitive components. Proper handling, shipping, and storage precautions must be exercised:

- You must remove and install cards in a static-free environment. Wear an antistatic wrist strap that is plugged into the Kentrox equipment so you are grounded at the same point as the equipment.
- Do not remove cards from their antistatic plastic bags until you are ready to install them into the chassis.
- Immediately after you remove a card from the chassis, you must insert it into its antistatic bag.
- When the cards are not in use, keep them in their antistatic plastic bags.
- Do not ship or store cards near strong electrostatic, electromagnetic, or radioactive fields.

Ground Caution



CAUTION: For Kentrox equipment to operate safely and correctly, there must be a safety ground strap between the equipment ground bolts and the office ground.

Proper Cooling Caution



CAUTION: **ENSURE PROPER COOLING** When AI296 is installed into an AI180™ Alswitch series 180 chassis, the chassis must be equipped with the Alcool™ chassis cooling and Baffle-HS heat baffle with sensor assemblies.

The AI180I Alswitch series 180 integrated chassis has a built-in fan and baffle assembly and does not require additional assemblies.

FCC Warning

The Federal Communications Commission has set limits for emitted radio interference, and AI296 is constructed with this electromagnetic interference (EMI) limitation in mind. AI296 is classified under FCC regulations as a Class A device, that is, a device for use in commercial environments and not in residential areas. This device has been tested and shown to comply with the following FCC rule: Part 15 Subpart J. Operation of this equipment in a residential area may cause interference to radio and TV reception, requiring the user to take whatever steps are necessary to correct the interference.

Information is available from the FCC describing possible corrective actions. To maintain low EMI levels, we suggest that you use only metal connectors and shielded cable grounded to the frame.

Specifications are subject to change without notice.



Customer Assistance

Kentrox offers technical support 24 hours a day, seven days a week.

Before you contact Kentrox for assistance, please have the following information available:

- The type of hardware and software you are using
- The error number and exact wording of any messages that appeared on your screen
- What happened and what you were doing when the problem occurred
- How you tried to solve the problem

Web Site Support

Support is available 24 hours a day using our Web site at:

<http://www.kentrox.com>

Email Support

Email support is available 24 hours a day. When you use email support, please be sure to include the details of your problem within the email.

To contact Technical Support, send email to:

techsupport@ainet.com

Phone Support

Phone support is available. When you call Kentrox for support, please be sure you are at your computer and have the details of your problem available.

To contact Technical Support, call (866) 480-3571.

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<http://www.kentrox.com>

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Product Description

This chapter provides an overview of the AI296 16-port high speed multi-protocol line card.

Guide to this Chapter

[Features](#)

[AI296 Hardware Components](#)

[Technical Specifications](#)

[Individual Port Access](#)

[Typical Applications](#)

Features

The AI296 16-port high speed multi-protocol line card provides 16 physical ports for asynchronous or X.25 connections between NEs and OSSs in a carrier's network. AI296 includes the following features:

Break Propagation

AI296 supports break propagation on X.25, asynchronous, or TCP protocols. Refer to [Chapter 8: Alias and Call Routing Configuration](#) for details about available types of break handling.

BX.25 Compatibility

AI296 is BX.25 compatible and supports passive links.

DCD/DSR/RTS/DTR Signal Lead Control

AI296 supports user selectable disconnect on DCD low, DCD high-to-low transition, DSR low, and DSR high-to-low transition. Additionally, AI296 allows for user selectable connection control of DTR/RTS.

Dynamic Port Configuration

Any X.25 or asynchronous parameter can be changed and individual links can be reconfigured without resetting AI296. X.25 and asynchronous parameters take effect after disabling and then re-enabling the affected link.

EIA Lead Signaling

AI296 can program the disconnected and connected states of EIA signals and toggle the leads. The system can use EIA signaling to simulate modem style access to host computers. These signaling options provide a secure and flexible connection to any asynchronous host or modem port. Refer to command [staeia on page 9-89](#) for more details.

IRB Connectivity

AI296 communicates with other cards in the same chassis over an internal repeater bus. It cannot communicate over the backplane with line cards that do not use the IRB.

Line Monitoring Diagnostics

X.25 line monitoring diagnostics are available from the shell connection. Refer to command [diag-line on page 9-46](#) for more details.

Link-to-Link Call Routing

Link-to-link call routing lets users route all SVC calls coming in on one X.25 link to another X.25 link. By using X.25 link-to-link call routing, it is now possible to create a default route for all calls from a specified X.25 link. The alias for the default link-to-link route can route all calls destined for the same link. On previous versions of AI296, users had to create an alias for each unique called address.

Performance Monitoring, Maintenance, Troubleshooting

Shell and winslc commands let users handle performance monitoring, maintenance, and troubleshooting for AI296.

Remote and Local Configuration

AI296 can be configured from AI198™ by accessing the AI198 menu system. AI198 is accessible using a Telnet session or by plugging a terminal into the AI198 Craft port.

Simultaneous Connections

AI296 supports up to 1024 simultaneous X.25 to IP and/or IP to X.25 virtual connections. It supports 512 simultaneous X.25 to X.25 virtual connections or child connections. These connections may be distributed in any combination across the 16 available serial ports on AI296.

Single Alias Translation

Single alias translation allows routing a call from an incoming link on one AI296 to an outgoing link on a second AI296/AI232™/Alscout™ with a single alias. Generally, this feature is used to route an X.25 connection across two AI296/AI232/Alscout cards using TCP/IP.

SNMP Manageability

AI296 supports configuration using SNMP as well as monitoring. SNMP traps are generated by AI296 and are sent to all the management stations that exist in the trap table.

Standalone Configuration

AI296 operates as a standalone card when it is installed in the Alswitch series 110 chassis. Standalone mode lets AI296 function without dependence on AI198 for configuration and management. Refer to [Appendix B: Standalone Mode and Switch Mode](#) for more details.

System Diagnostics

AI296 lets users view diagnostic data on existing connections and internal information about serial links. For more information about viewing system diagnostics, refer to sections:

- [diag-conn on page 9-27](#)
- [diag-eth on page 9-29](#)
- [diag-info on page 9-37](#)
- [diag-line on page 9-46](#)
- [diag-tconn on page 9-49.](#)

TID Multiplexing

TID multiplexing allows a single call from a legacy X.25 OSS to fan out into multiple calls to various NEs. The initiating call may be X.25, asynchronous, or TCP. Refer to [Chapter 7: TID Multiplexing](#) for more details.

AI296 Hardware Components

AI296 has four high density connectors that provide 16 asynchronous, HDLC-Bridge, PPP, or X.25 ports. Individual ports are derived by using a cable assembly or a distribution panel. Protocol changes to a single port can be made without interrupting communications on the other ports. Each port operates at speeds up to 115 kilobits per second asynchronous or 128 kilobits per second synchronous.

AI296 supports both X.25 and TCP/IP protocols and provides concurrent X.25, TCP/IP, HDLC-Bridging, and asynchronous functionality. An Ethernet port is available on the front panel or on the backplane interface (IRB). AI296 uses the IRB to transfer data to and from other cards in the system and network.

AI296 can be used in an AI shelf with other AI network interface cards to provide single, multiple, and redundant trunk lines with a variety of physical port and protocol types, including:

- EIA-232
- EIA-530
- X.25
- V.35
- IP
- Asynchronous
- PPP
- HDLC-Bridge

When combined with other AI network interface cards, typical applications include collection, concentration and trunking of alarm and event messages from many NEs to one or more OSSs and operations centers.

AI296 meets Bellcore Network Equipment Building Standards (NEBS) to ensure reliable operations in Central Offices and other telecommunications facilities.



CAUTION: Alswitch and its peripherals contain electrostatic sensitive components. Exercise proper handling, shipping, and storage precautions.

Front Panel Components

[Figure 1-1](#) displays the AI296 front panel components.

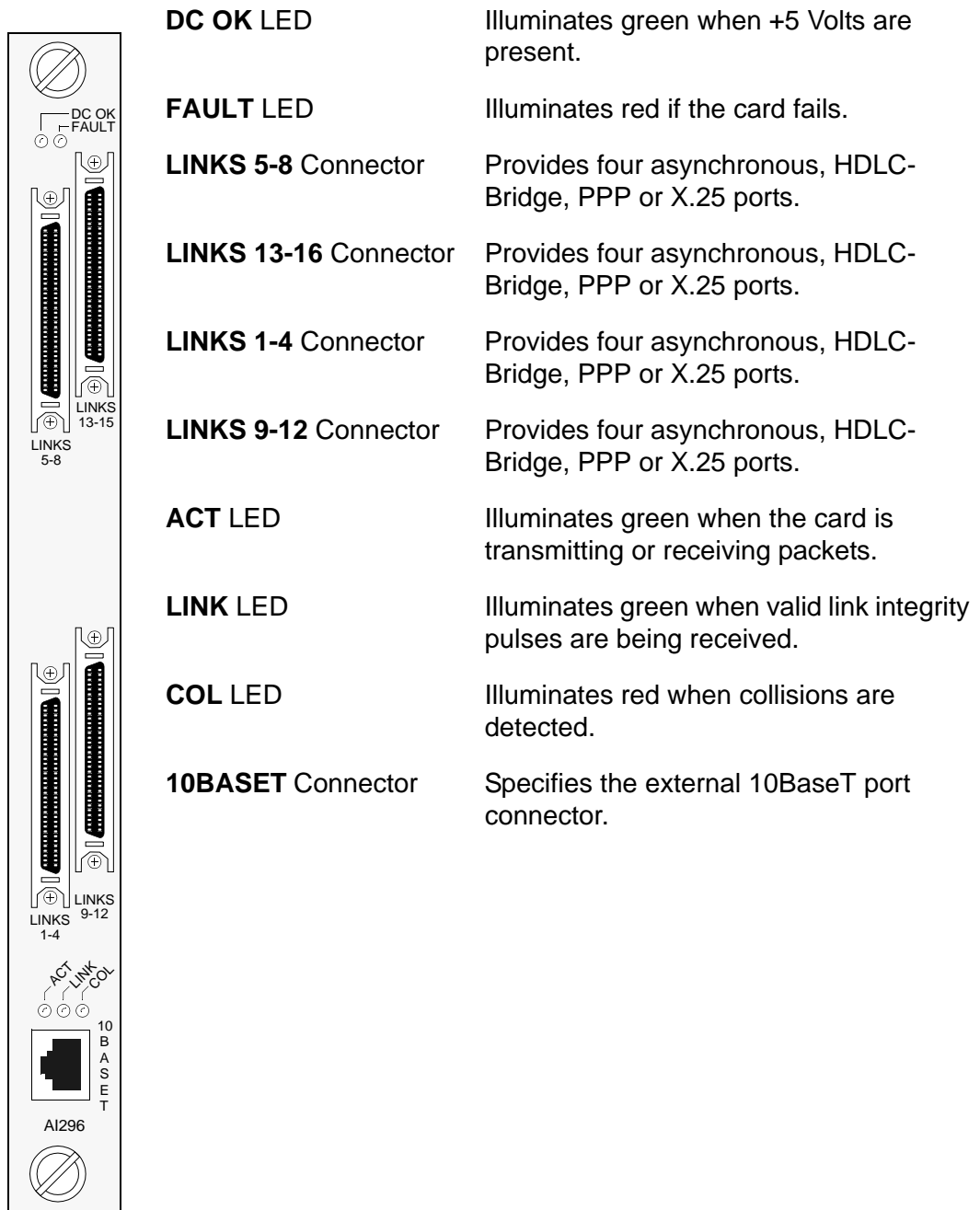



Figure 1-1
AI296

Technical Specifications

[Table 1-1](#) lists the AI296 technical specifications.

Table 1-1 Technical Specifications

Component	Description
I/O Ports	16 asynchronous, HDLC-Bridge, PPP or X.25 (selectable per port during configuration)  Note: Individual ports are derived by using a CAB257 cable assembly for each connector or by using the Model DP196 distribution panel.
Port Speed	300 bps to 128 Kbps or external clocking (selectable per port during configuration)
Electrical Interfaces	RS-232, RS-530, and V.35 (selectable per port during configuration)
Installation	Requires one slot in an AI chassis (can be hot swapped)
Current Draw	4.2 A at +5 VDC, maximum
Compliance	For use with AI UL Listed Alswitch Series Chassis.

Individual Port Access

Individual ports are accessed by using a cable assembly or a distribution panel. AI296 uses the following components to derive ports:

- [CAB257 Cable](#)
- [DP196 Distribution Panel](#)

CAB257 Cable

The CAB257 cable has a multi-connector end that provides four DB-25 connectors. Four CAB257 cables are needed to derive all 16 ports.

DP196 Distribution Panel

The DP196 distribution panel provides the physical interface for AI296 with sixteen DB-25 connectors. The distribution panel is available in two sizes for 19-inch or 23-inch rack installations. [Figure 1-2](#) displays the distribution panel and [Table 1-2](#) lists the specifications.

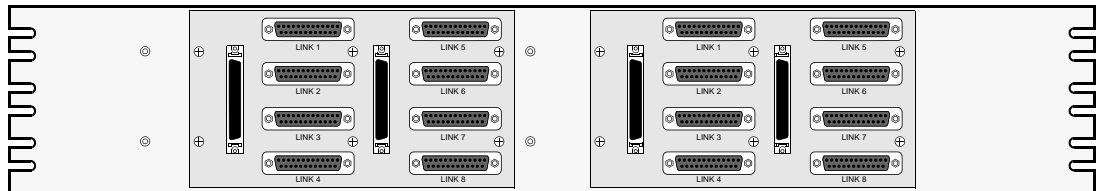


Figure 1-2 DP196-19/23 Distribution Panel

Table 1-2 DP196-19/23 Specifications

Description	Specification
Mounting	DP196-19—Mounts to a 19-inch rack DP196-23—Mounts to a 23-inch rack
I/O Ports	Sixteen DB-25 connectors
Weight (approximately)	2.5 lb. (1.12 kg)
Size	Height: 4 in. (10.16 cm) Width: 19 in.(48.26cm)/23in. (58.42 cm) Depth: 1.12 in. (2.84 cm)
Cable	CAB162—Connects one connector (4 ports) on AI296 to the distribution panel. Each distribution panel requires four cables.

DB-25 Connectors

[Table 1-3](#) displays pin assignments for the DB-25 connectors on the DP196-19/23 distribution panel.

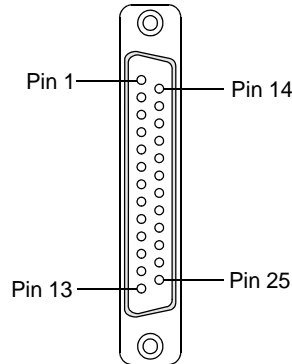


Figure 1-3 DB-25 connector Pin Assignments

[Table 1-3](#) displays the DP196-19/23 pin assignment specifications.

Table 1-3 DP196-19/23 Pin Assignment Specifications

Pin	Signal	Direction
2	TXD-	Output
3	RXD-	Input
4	RTS-	Output
5	CTS-	Input
7	Signal GND	----
8	DCD-	Input
9	RXC+	Input
10	DCD+	Input
12	TXC+	Either
13	CTS+	Input
14	TXD+	Output
15	TXC-	Either
16	RXD+	Input
17	RXC-	Input

Table 1-3 DP196-19/23 Pin Assignment Specifications (Continued)

Pin	Signal	Direction
19	RTS+	Output
20	DTR-	Output
23	DTR+	Output

The following characteristics apply to pin assignments:

- Any pin assignment not referenced on a connector is not connected.
- Signals with a (-) sign after them are used when RS-232 is selected.
- Signals with both (+) and (-) after them are used when RS-530, V.35, or V.11 are selected.
- When RS-530 is selected, both the (+) and the (-) signals are used. The DSR is only supported in RS-232 mode. There is no DSR+ signal.

 **Note:** The pin assignments also apply to CAB257.

RJ45 10BaseT Connectors

[Figure 1-4](#) displays the RJ45 10BaseT connector.

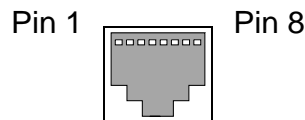


Figure 1-4 RJ45 10BaseT Connector on an AI296 Front Panel

[Figure 1-4](#) lists the specifications for the RJ45 10BaseT connector.

Table 1-4 RJ45 10BaseT Connector Specifications

Pin	Signal	Direction
1	TD+	Output
2	TD-	Output
3	RD+	Input
6	RD-	Input

CAB182 cables connect network elements to the individual connectors on the distribution panel (straight through applications).

Typical Applications

AI296 is used primarily for X.25 trunking and connecting different types of network elements. The following applications are discussed in this section:

- [Asynchronous to TCP/IP Application](#)
- [IP Over X.25 Networks](#)
- [Mixed Asynchronous and X.25 Networks](#)
- [X.25 to TCP/IP Application](#)
- [X.25 Trunking](#)

Asynchronous to TCP/IP Application

[Figure 1-5](#) illustrates an asynchronous to TCP/IP application.

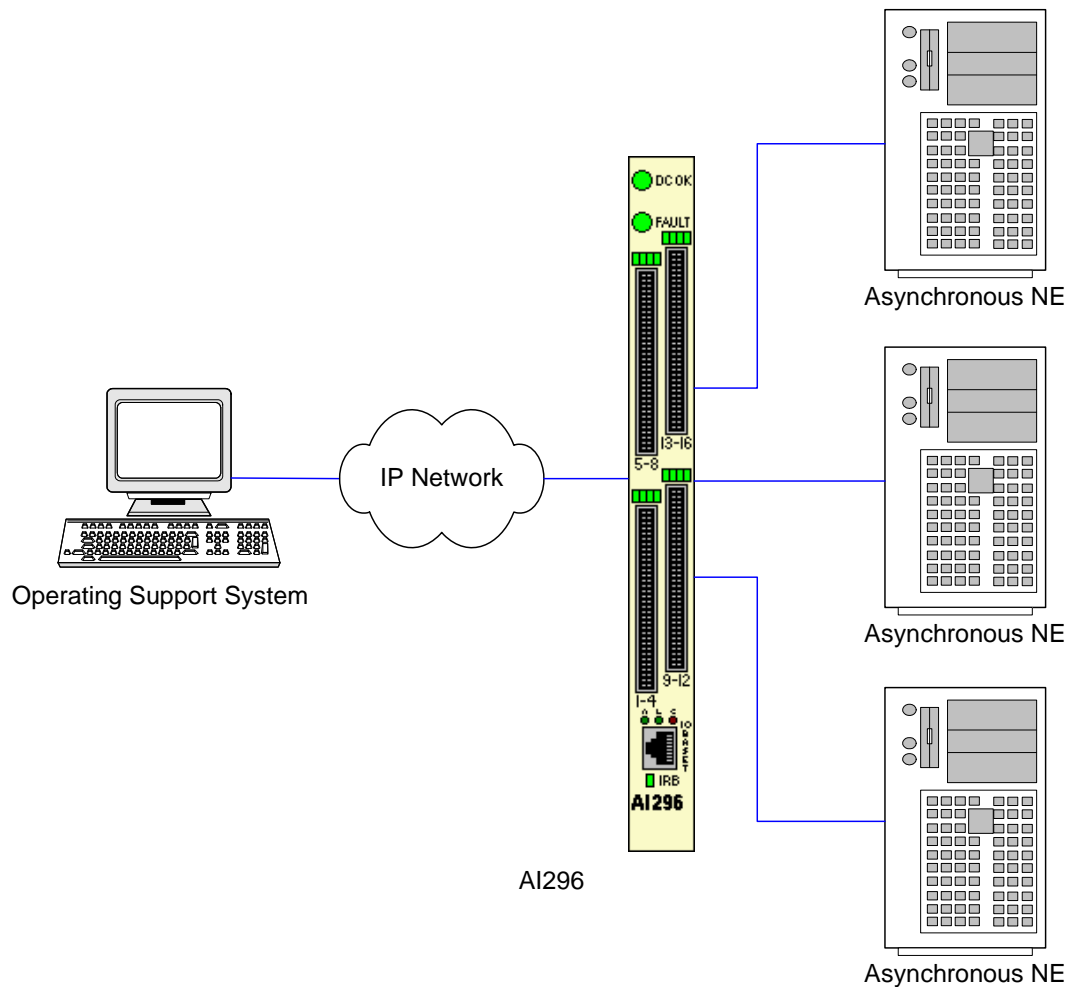


Figure 1-5 Asynchronous to TCP/IP Application

The following events occur in [Figure 1-5](#):

- The OSS sends TCP/IP calls to AI296.
- AI296 routes the TCP/IP calls to an asynchronous NE using an asynchronous port.

IP Over X.25 Networks

[Figure 1-6](#) illustrates a common IP over X.25 application.

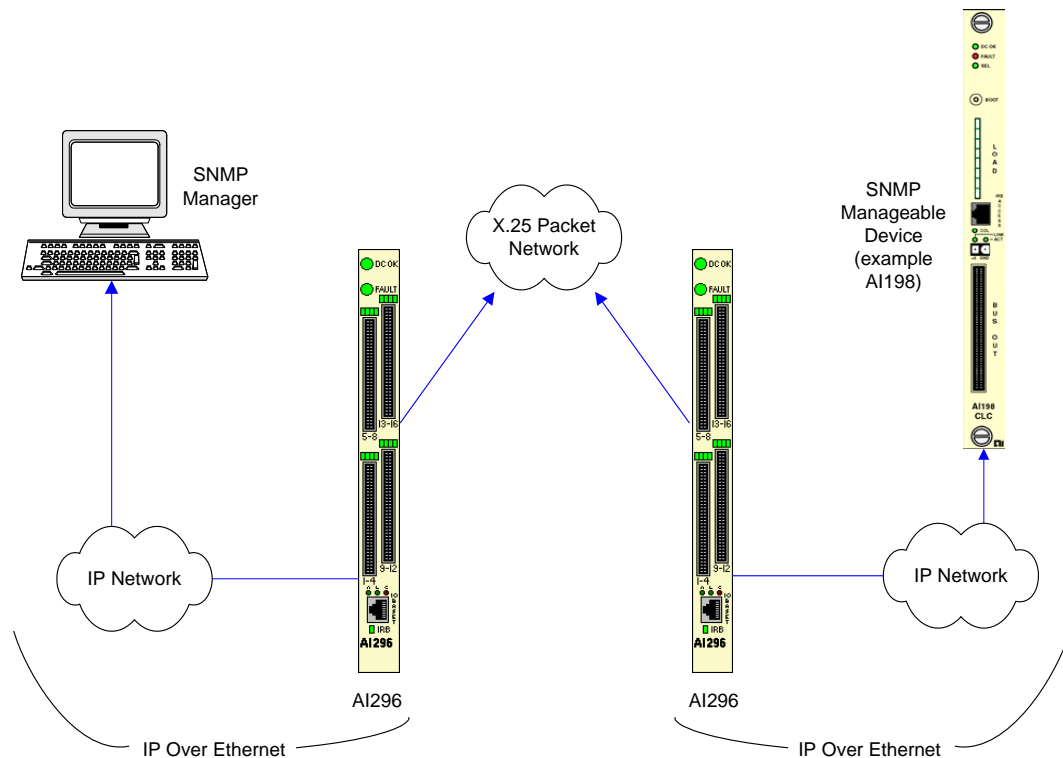


Figure 1-6 IP Over X.25 Network

In [Figure 1-6](#), AI296 is used to tunnel IP traffic through an X.25 network. AI296 can be configured to encapsulate IP packets, making it possible to achieve IP connectivity across a legacy X.25 network. The most common application for this functionality is to transport SNMP management information across an X.25 network.

Important: IP/X.25 transport works only over SVCs.

[Figure 1-6 on page 1-12](#) illustrates the following events:

- The SNMP Network Manager (for example, AppliedView) sends TCP/IP calls over an IP/Ethernet network to Alswitch (AI296).
- AI296 encapsulates the TCP/IP calls within X.25 SVC calls and sends them through the X.25 packet network.
- The X.25 packet network sends the X.25 calls to a remote Alswitch (AI296).
- The remote AI296 returns the X.25 calls to TCP/IP calls based on its static routing tables.
- AI296 sends the TCP/IP calls over the IP/Ethernet network to the SNMP-managed device (for example, AI198).

Mixed Asynchronous and X.25 Networks

[Figure 1-7](#) illustrates both X.25 network elements and asynchronous network elements connected to a remote OSS using a single X.25 trunk.

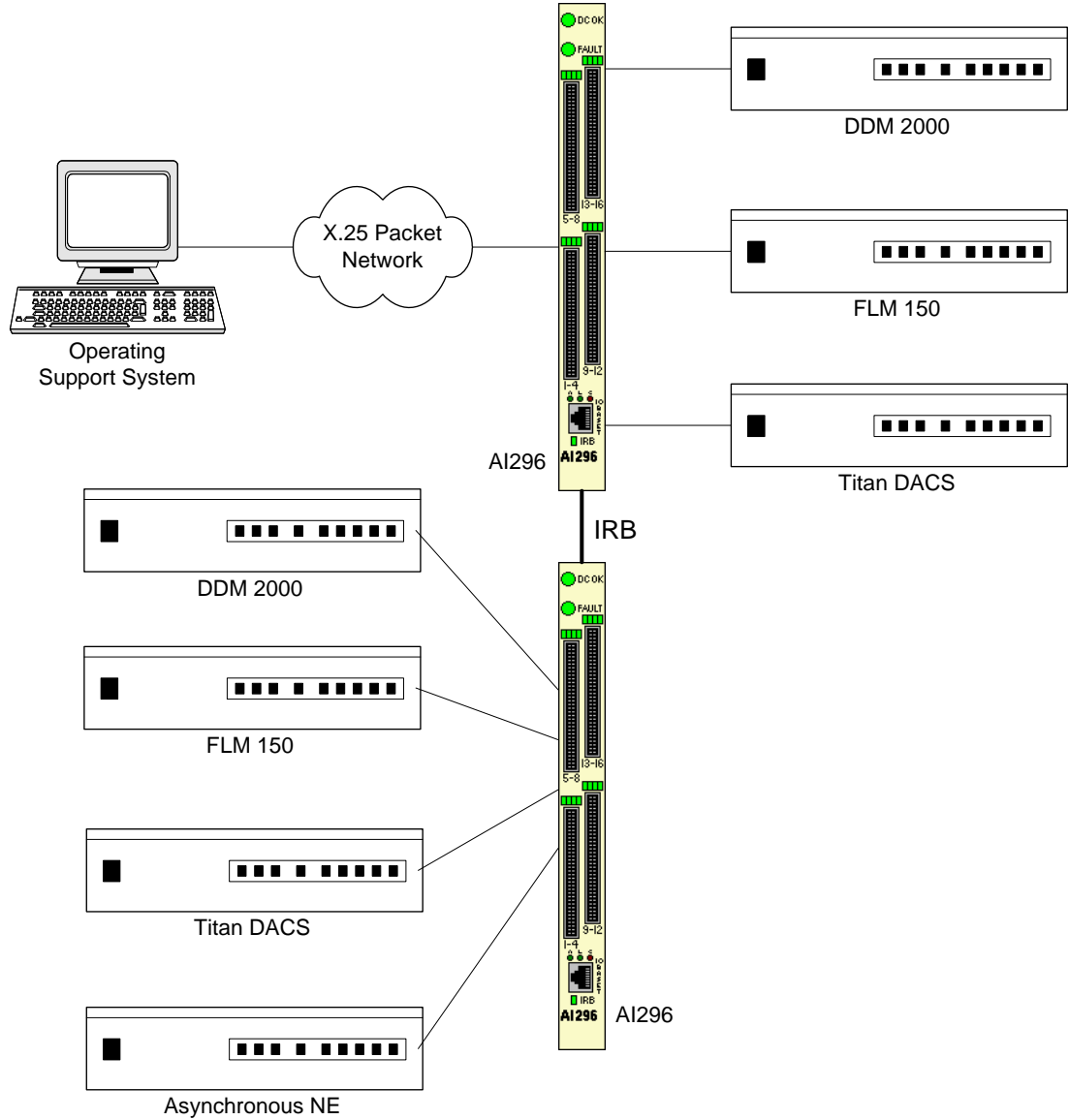


Figure 1-7 Mixed Asynchronous and X.25 Network

[Figure 1-7](#) illustrates the following events:

- The OSS sends X.25 calls through an X.25 packet network to AI296.
- AI296 makes call routing decisions based on the AI198 routing alias.
- AI296 sends local X.25 calls directly to the attached NEs.
- The local AI296 converts local X.25 calls to TCP/IP calls and routes them over the IRB to a remote AI296. Routing is based on the routing aliases configured in AI198.
- The remote AI296 sends asynchronous calls to the attached asynchronous NEs.

X.25 to TCP/IP Application

[Figure 1-8](#) illustrates a common X.25 to TCP/IP application. X.25 network elements are connected to a router network using a TCP/IP LAN.

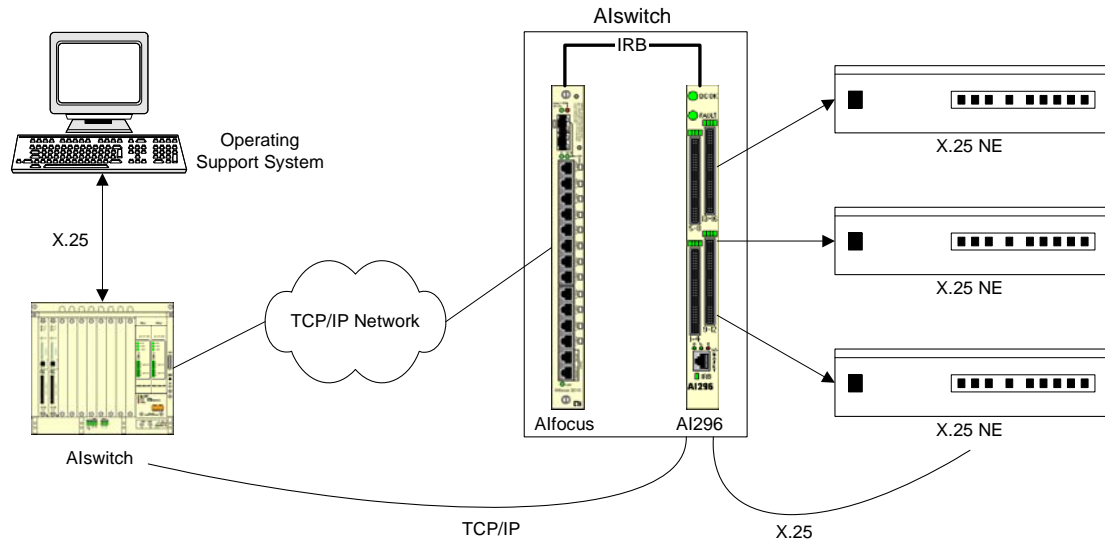


Figure 1-8 X.25 to TCP/IP Application

[Figure 1-8](#) illustrates the following events:

- The OSS sends X.25 calls to Alswitch.
- Alswitch converts X.25 calls to TCP/IP calls and sends them over the router network.
- The router network carries the TCP/IP calls to Alfocuss™.
- Alfocuss sends the TCP/IP calls over the IRB to AI296.
- Based on the AI198 routing alias, AI296 converts the TCP/IP calls to X.25 calls.
- AI296 sends X.25 calls to the attached X.25 NEs.

Like other Alswitch line cards, AI296 terminates X.25 connections and extracts the data from them. Unlike other line cards, AI296 can convert the X.25 connections to TCP/IP connections across the IRB. The ultimate destination for these TCP/IP connections may be one of the following:

- An IRB-connected line card in the same chassis, such as another AI296 or an AI193-TX™
- A locally connected TCP/IP host
- A remote TCP/IP host, indirectly connected to Alswitch using a router network.

When AI296 establishes a TCP/IP connection to an external device, the IP packets are exported from Alswitch by Alfocuss or by an AI router.

X.25 Trunking

[Figure 1-9](#) illustrates a common X.25 trunking application.

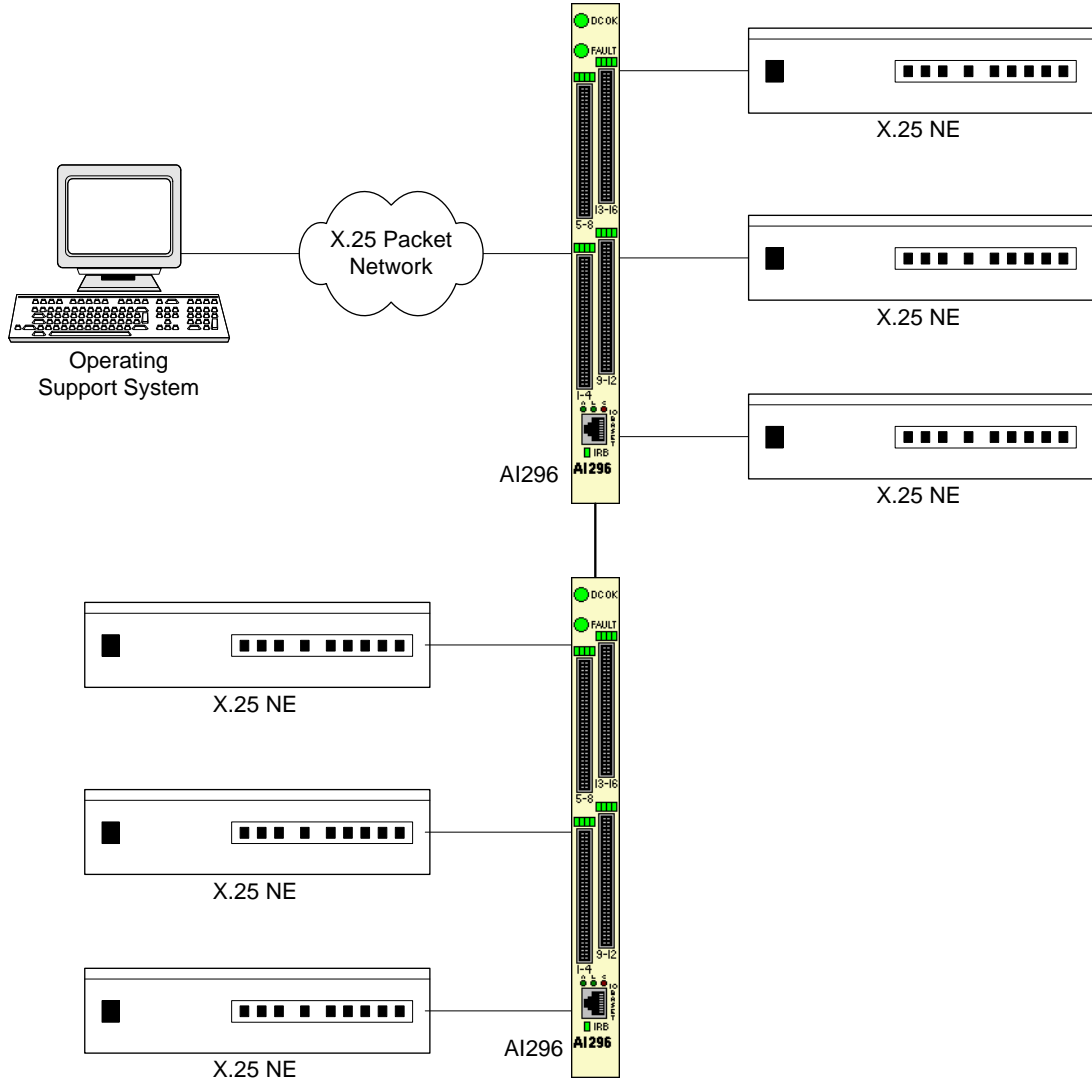


Figure 1-9 X.25 Trunking

[Figure 1-9](#) illustrates the following events:

- The OSS sends X.25 calls through an X.25 packet network (over an X.25 trunk) to AI296.
- AI296 makes call routing decisions based on the AI198 routing alias.
- AI296 sends local X.25 calls directly to its attached NEs. X.25 NEs are connected to the OSS with a single X.25 trunk.
- AI296 converts local X.25 calls to TCP/IP calls and sends them over the IRB to a remote AI296.
- The remote AI296 sends remote X.25 calls directly to its attached network elements.

Using the AI198™ Menu System

This chapter provides information on starting, ending, and navigating through an AI198 menu system session.

Guide to this Chapter

[Accessing the Menu System](#)

[Navigating the Menu System](#)

[Exiting the Menu System](#)



Accessing the Menu System

To access the AI198 menu system:

1. Log into AI198.
2. At the prompt, enter `menu`. The Main Menu appears.

```
>menuMain Menu

01+Configure options affecting the system as a whole
02+Create, delete, or modify a destination name
03+Display all destination names
04+Configure cards
05+Set or remove connection restrictions based on port numbers
06+Display all connection restrictions
07+Configure slot density
08+Configure the alias translation table
09+Display the list of alias translation entries
10+Configure the BOOTP table

21 Exit the configuration menu system
Enter item number and optional ",value" then push <CR> key
>
```

Navigating the Menu System

Menu Numbering Structure

All menus accessed from the Main Menu are identified with a numerical reference at the top right corner of the menu screen. This numerical reference specifies the location within the menu system. Each digit in the menu number represents a menu item that was previously selected. For example, Menu 4.2 indicates that menu item 4 and 2 were selected.

```
>2
Menu 4. 2
01 Configure as Empty Slot
02+Configure as AI183/AI185 standard 4/16 port card
03+Configure as AI193/194 Ethernet card with slot expansion of-----
04+Configure as AI192/196 X.25 network card with slot expansion of-----
05+Configure as ASP or Advanced Smart Line Card with slot expansion of-----
06 Configure as AI196-I network card with Local View
07 Configure as AI2524 Router card
08 Configure as AI294 Ethernet Switch card
09+Configure as AI196-I network interface card with menu support
10 Configure as Independent Smart Line Card
11+Configure as AI296 network interface card
12+Configure as AI192/196 with full menu support and slot expansion of-----
13+Configure as AI285 network interface card
14+Configure as AI232 network interface card
15 Configure as AI Modem
16 Configure as AI Flex Fiber LAN Extender Card
17 Configure as AI120 Card
18 Configure as AIE1 Card
19 Configure as AITC Card
20 Next Page
21 Exit this menu with no changes
Enter item number and optional ", value" then push <CR> key
>
```

Types of Menu Items

The following four types of menu items are available:

- [Submenus](#)
- [Toggles](#)
- [Data](#)
- [Functions](#)

Submenus

Submenus go to deeper levels in the menu hierarchy. They provide additional configuration menus. Menu items that contain submenus have a plus sign (+) next to their menu item number. In this example, menu item 02 will display a submenu.

```
02+Configure as AI 232 network interface card
```

Some submenus require a selection from a list and then re-display the previous menu showing the selection. Other submenus have their own submenus that request additional information. After saving the entries, the top-level menu re-appears.

Toggles

Toggles display two or more values that can be selected for a parameter. Toggles have an asterisk (*) next to their menu item number. Entering the menu item number toggles to the next selection.

In this example, menu items 06 and 07 are toggles.

```
06*TCP Default Window Size (200, 512, 1024, 2048)----- 200
07*TCP Send Ahead-----OFF
```

For 06*TCP Default Window Size, the user can toggle between values 200, 512, 1024, and 2048. For 07*TCP Send Ahead, the user can toggle between ON and OFF.

Data

Data menu items request text entries (such as destination names and card descriptions) or numeric values (such as port numbers and IP addresses). To enter information in a data menu item, enter the menu item number followed by a comma (or a space) and the configuration information.

In this example, the menu item requires an IP address entry.

```
01 IP Address (0.0.0.0 - 255.255.255.254)-----000.000.000.000
```

To enter an IP address of 172.016.002.043, enter the following:

1, 172. 016. 002. 043

The menu re-appears with the entered IP address.

```
01 IP Address (0.0.0.0 - 255.255.255.254)-----172.016.002.043
```

To change configuration data that has been entered for a menu item, enter the menu item number followed by a comma and the new data.



Tip: To change a typed entry, use BACKSPACE to back up to the desired position in the text and retype the changes. However, once the user presses ENTER, changes can be made only by selecting that menu item and re-entering the data.

Functions

Menu item functions appear at the bottom of each menu. This example displays menu items that can appear and [Table 2-1](#) describes them.

```

17 Display first page
18 Next page
19 Delete entry
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ", value" then push <CR> key
>
    
```

Table 2-1 Menu Item Descriptions

Menu Item	Description
17	Displays the first page of a menu.
18	Displays additional pages of a menu.
19	Deletes information for a specified entry.
20	Saves the entered information and re-displays the previous related menu. Important: Configuration entries take effect only after every screen has been saved going back to the main menu.
21	Exits a menu without saving changes. All items on the menu return to the previously configured values.

Exiting the Menu System

To exit the menu system:

1. Access the Main Menu.
2. Enter 21. The command prompt appears.

AI296 Local Menu System

This chapter provides information on the configuration and navigation of the AI296 menu system. This system offers on-board configuration capabilities similar to those available in the AI198 menu system. The AI296 menu system is available when the card is operating in both switch mode and standalone mode.

Guide to this Chapter

[Identifying AI296 Menu System Security Options](#)

[Logging Into AI296](#)

[Accessing the Local Menu System](#)

[Navigating the Local Menu System](#)

[Accessing the Help Menu](#)

[Exiting the Local Menu System](#)

Identifying AI296 Menu System Security Options

AI296 has a variety of security options, including:

- [Multilevel User Name and Password Security](#)
- [RADIUS Authentication](#)
- [TACACS+ Authentication](#)
- [PPP Authentication Protocols \(PAP and CHAP\)](#)

Multilevel User Name and Password Security

Up to 10 configurable user account profiles can be assigned to an AI296 user. Five system profiles are available for providing various levels of user access. For more information about user profiles, refer to command profile on page 1-103.

RADIUS Authentication

RADIUS authentication verifies user login information against valid user information in a database on a centralized RADIUS authentication server. A primary and secondary RADIUS server are configurable to provide secure access for an entire AI296 network. AI296 RADIUS authentication is available for Telnet, asynchronous, and synchronous ports. For more information on RADIUS authentication, refer to section RADIUS Configuration on page 1-19.

TACACS+ Authentication

TACACS+ authentication verifies user login information against the user's permission level on a TACACS+ server. Up to 9 TACACS+ servers are configurable to provide secure access for an entire AI296 network. AI296 TACACS+ authentication is available for Telnet, asynchronous, and FTP connections. For more information on TACACS+ authentication and server configuration, refer to the following commands:


- [aaa](#)
- [tacacs](#)
- [tacacs server](#)

PPP Authentication Protocols (PAP and CHAP)

All asynchronous and synchronous PPP links are configurable to use either PAP or CHAP PPP authentication protocols. PAP establishes peer identity using a 2-way handshake that is done only upon initial link establishment. CHAP performs a 3-way handshake upon initial link establishment, then proceeds to verify the link with 3-way handshakes at random intervals. CHAP also encrypts the user's password over the PPP link to provide added security.

Logging Into AI296

Log into AI296 with a Telnet connection or with any of AI296's asynchronous ports that are configured as Login ports.


 **Note:** ai is the default user ID and password. AI296 prompts you to create a new user ID and password after the fifth login with the default values. Refer to command [useradd on page 9-118](#) to create a new user ID and password.

Using a Telnet Connection for Login

Logging in using a Telnet connection requires that AI296 has a configured IP address. If an IP address has not been configured, refer to [Chapter 4: System Configuration](#) to assign an IP address.

To log into AI296 using a Telnet connection:

1. Power on AI296.
2. Connect the Ethernet network connection to the 10BaseT port on the front panel of AI296.
3. Telnet to AI296. The login prompt appears.

 **Note:** ai is the default user ID and password. There are five grace period logins. If after the fifth login a new ID and password have not been created, AI296 prompts you to create a user ID and password. Use the useradd command described in [Chapter 9: AI296 Commands](#) to create a user ID and password.


4. Enter your user ID. The password prompt appears.
5. Enter your password. The destination menu appears. You are now logged into AI296.

The following message appears when AI296 is configured to contact a TACACS+ server during authentication:

```
login: test
Password:
Contacting TACACS+ server. Please wait.
```

The following message appears when AI296 is configured to contact a TACACS+ server during authentication, but the contact attempt fails:

```
login: test
Password:
Contacting TACACS+ server. Please wait.
TACACS+ server(s) not responding.
```

 **Note:** Five consecutive failed login attempts generate an SNMP trap and a log message saying that the login failed. Also, an entry appears in the log file with text stating `Warning: X consecutive failed login attempts` where *x* is the number of consecutive failed login attempts.


Using an Asynchronous Port for Login

Two tools are required for logging into AI296 using an asynchronous port:

- A PC with terminal emulation software such as HyperTerminal (included with Windows 95/98/2000/XP) or ProComm.
- Terminal cable with these specifications: null (RS232) cable with DB25 male connector for AI296 distribution panel connection and appropriate connector for your PC.

To log into AI296 using an asynchronous port:

1. Set the terminal emulation software to the following settings:
 - 9600 baud
 - No parity
 - Eight data bits
 - One stop bit
2. Power on AI296.
3. Connect a PC to port 1 on the DP232 distribution panel.

 **Note:** Link 1 on AI296 is enabled and configured for login by default, which allows access through the link. AI296 may also be accessed through any asynchronous link that is enabled and configured for login.

4. Press ENTER. The login prompt appears.
5. Enter your user ID. The password prompt appears.
6. Enter your password. The destination menu appears. You are now logged into AI296.

The following message appears when AI296 is configured to contact a TACACS+ server during authentication:

```
login: test
Password:
Contacting TACACS+ server. Please wait.
```

The following message appears when AI296 is configured to contact a TACACS+ server during authentication, but the contact attempt fails:

```
login: test
Password:
Contacting TACACS+ server. Please wait.
TACACS+ server(s) not responding.
```



Note: Five consecutive failed login attempts generate an SNMP trap and a log message saying that login failed. Also, a new entry will appear in the log file with text stating `Warning: X consecutive failed login attempts` where *x* is the number of consecutive failed login attempts.



Accessing the Local Menu System

To access the AI296 menu session:


1. Log into AI296. Refer to section [Logging Into AI296 on page 3-3](#) for more information.
2. At the destination menu, enter `ai` . The AI296 shell prompt appears.
3. Enter `menu`. The AI296 Main Menu appears.

```
AI 296 Mai n Menu

+ Li nk Menu
+ Al i as Menu
+ System Menu
+ Static Route Menu

.....
:
:   Select the desired menu option using the UP or DOWN arrow key.
:   Then press ENTER or RETURN to continue.
:
:.....

<F1> Hel p                <F4> Cl ose
```

 **Note:** The Alias Menu is only available when you log into AI296 in standalone mode.



Navigating the Local Menu System

Arrow keys and keyboard short cuts can be used to navigate through the local menu system. Refer to [Table 3-1](#) for a list of arrow key movements and keyboard shortcuts.


 **Note:** To use the arrow keys in the menu system, make sure the VT100 arrow keys are enabled in either your Telnet settings or your terminal emulation program.

Table 3-1 Direction Keys

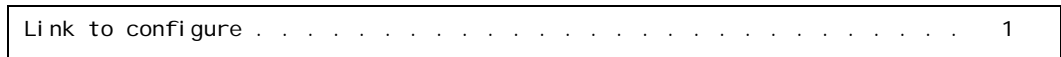
Direction	Keys
Up	Use the up arrow key or Press <Ctrl-p>
Down	Use the down arrow key or Press <Ctrl-n>
Right	Use the right arrow key or Press <Ctrl-f>
Left	Use the left arrow key or Press <Ctrl-b>

Identifying Types of Menu Items

The AI296 local menu system contains data items that let you input information or toggle between available selections.


Data Entry Items

The following screen shot displays an example of a data entry menu item:



To enter information for a data entry menu item:

1. Move the cursor to the menu item.

 **Note:** If the selected menu item has a range of valid values, that range will appear in the bottom right of the screen.

2. Enter your data.

To erase existing data for a data entry menu item:

1. Move the cursor to the menu item.
2. Delete the data using BACKSPACE or DELETE and press ENTER.

OR

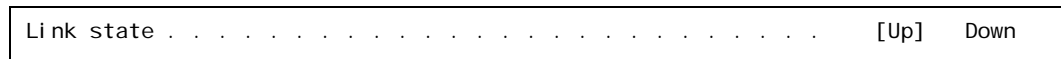
Enter new data.

To save your changes:

- Press F2 (or use the up and down arrow keys to highlight [Send]) and ENTER.
- Enter y to save. If an error message appears, check your work and make changes as necessary.
- Press CTRL-E to save data entries immediately without being queried to save. If an error message appears, check your work and make changes as necessary.

Toggle Items

The following screen shot displays an example of a toggle menu item. The selected option has brackets around it.



To select a value for a toggle menu item:

1. Move the cursor to the menu item.
2. Highlight the option you want to select and press ENTER. The brackets move to that option.

To save your changes:

- Press F2 (or use the up and down arrow keys to highlight [Send]) and ENTER.
- Enter y to save. If an error message appears, check your work and make changes as necessary.
- Press CTRL-E to save data entries immediately without being queried to save. If an error message appears, check your work and make changes as necessary.

Accessing the Help Menu

The AI296 help menu lists all available keyboard codes and function keys with their associated purposes. The help menu can be accessed by doing one of the following things:

- Pressing F1 and ENTER
- Selecting `Hel p` on the menu and ENTER
- Pressing ESC-1 and ENTER.

The following example displays the first page of the local menu system help screen:

Navi gati on Hel p Page 1 of 4

This screen di splay s when you press the <F1> key or if you enter an inval id key-stroke from the Mai n Menu. The fol lowi ng keyboard functi on keys are programmed to allow you to enter or change data i n menus:

<F1>; <F2>; <F4>; UP Arrow; DOWN Arrow; LEFT Arrow; RIGHT Arrow

If you can not locate these keys on your keyboard, use the fol lowi ng keyboard equi valent codes to provi de the same functi onal i ty:

Keyboard Code	Function Key	Purpose
Esc 1	<F1>	HELP - di splay s thi s help screen from any menu.
Esc 2	<F2>	SEND - transmi ts the currentl y di splay ed data. You are given a confi rmati on prompt before the actual transmi tti ng of data occurs. When you press the <F2> key, the RIGHT and LEFT arrow keys can then be used to access the other commands.

Press SPACE BAR to continue, or 'q' to quit

Exiting the Local Menu System

To exit the local menu system and save all changes:

1. Select <F2> *Send* and press ENTER.

The following prompt appears:

Save changes? (y/n)

2. Save the changes:

y

3. Select <F4> *Close* and press ENTER until you are out of the menu system.

To exit the local menu system without saving changes, execute step [3](#).



Note: Entering <CTRL> + R takes you directly to the main menu.

System Configuration

This chapter provides information on configuring AI296 system settings with the AI198 menu system and the AI296 local menu system. To configure AI296 with the AI198 menu system, the AI198 software must be at version 1.90 or later. The AI198 menu system settings take effect only when AI296 is operating in switch mode (non-standalone mode).

Guide to this Chapter

[General System Properties Configuration](#)

[RADIUS Configuration](#)

[TACACS+ Configuration](#)

[SNMP Configuration](#)

[Static Route Configuration](#)

[TID to Modem Mux Configuration](#)

[Time Configuration](#)

General System Properties Configuration

General system properties are configurable at the first level of the AI198 and AI296 System menu. The following menu items can be configured:

- [Destination Menu Break Sequence](#)
- [Ethernet Port Settings](#)
- [FTP Port](#)
- [IP Settings](#)
- [Passive Link Settings](#)
- [System Prompt](#)
- [TCP Settings](#)
- [Telnet Port](#)

Destination Menu Break Sequence

Description

This menu item sets the character sequence that lets the user exit a connection from the destination menu.

Format

Destination menu break sequences take the following format:

attention_keystroke [delay_start, delay_end] next_character

attention_keystroke Defines the keystroke that indicates that a break sequence is coming. Valid values are:

- *<x>* where *x* represents the decimal ASCII value of the keystroke. For example, enter *<9>* to represent the TAB key.
- *<c>x* where *<c>* represents the CTRL key and *x* represents the actual key name. For example, enter *<c>^* to represent CTRL+SHIFT+6.
- *<c><x>* where *<c>* represents the CTRL key and *x* represents the decimal ASCII value of the actual key name. For example, enter *<c><9>* to represent CTRL+TAB.

delay_start Defines the amount of time (in seconds) you must wait before entering the next character. Valid values are integers from 0 to 8.



delay_end

Defines the amount of time (in seconds) before which you must enter the next character. Valid values are integers from 1 to 9.



Note: If you do not enter the next character within the configured time frame, then both the *attention_keystroke* and *next_character* values are treated as data and forwarded.

next_character

Defines the next character in the sequence. Valid values are:

- `<x>` where *x* represents the decimal ASCII value of the keystroke. For example, enter `<9>` to represent the TAB key.
- `<c>x` where `<c>` represents the CTRL key and *x* represents the actual key name. For example, enter `<c>^` to represent CTRL+SHIFT+6.
- `<c><x>` where `<c>` represents the CTRL key and *x* represents the decimal ASCII value of the actual key name. For example, enter `<c><9>` to represent CTRL+TAB.



Note: You can include multiple characters with delays between each in the break sequence. For example, `<c>^[1, 5]x[0, 9]k` is a valid entry.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11 pg 2.
2. From Menu 4.2.11 pg 2, enter 3, and the desired destination menu break sequence. The maximum length is 44 characters. The default is `<c>^[1, 5]x`.

This example displays item 03 Destination Menu Break Sequence configured as `<c>^[2, 6]x`.

```
>3, <c>^[2, 6]x  
Menu 4. 2. 11 pg 2  
01*10 Base T Ethernet-----OFF  
02+Radi us Configurati on Menu  
03 Destinati on Menu Break Sequence-----<c>^[2, 6]x
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. Enter a character sequence for Destination Menu Break Sequence. Maximum length is 44 characters. The default is <c>^[1, 5]x.

The following example displays item Destination Menu Break Sequence set to <c><33>.

```
System Menu

System Prompt . . . . . [232]
Destinati on Menu Break Sequence . . . . . <c><33>
```

Ethernet Port Settings

Description

The Ethernet port settings are configured using two menu items:

- 10BaseT Ethernet—Enables or disables the 10BaseT Ethernet port on the front panel of AI296.
- Dual Ethernet—Enables or disables simultaneous operation of the faceplate mounted 10BaseT Ethernet port and the IRB.



Note: When the dual Ethernet setting is enabled, the 10BaseT Ethernet setting has no effect on AI296 operation.

Menu Item Type

Toggle for both menu items

Configuration in the AI198 Menu System

1. Access Menu 4.2.11 pg 2.
2. For 01*10 Base T Ethernet, enter 1 to select OFF or ON. The default is OFF.
3. For 07*Dual Ethernet, enter 7 to select OFF or ON. The default is OFF.

This example displays 01*10 Base T Ethernet set to ON and 07*Dual Ethernet set to OFF.

```
>7
Menu 4. 2. 11 pg 2
01*10 Base T Ethernet----- ON
02+Radi us Configurati on Menu
03 Destinati on Menu Break Sequence-----<c>^[1, 5]x
04+TACACS Configurati on Menu
05 TCP Outgoing Connecti on Timer (2-360s)-----075
07*Dual Ethernet (On, Off)-----OFF
```



Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For 10 Base T Ethernet, select Off or On. The default is off when running in switch mode. The default is on when running in standalone mode.
3. For Dual Ethernet, select Off or On. The default is Off.

This example displays 10 Base T Ethernet set to ON and Dual Ethernet set to OFF.

```

System Menu

System Prompt . . . . . [232]
Destination Menu Break Sequence . . . . . <c><33>
TCP Default Window Size . . . . . [200] 512 1024 2048
TCP Send Ahead . . . . . On [Off]
Telnet Port . . . . . 23
FTP Port . . . . . 21
10 Base T Ethernet . . . . . Off [On]
Dual Ethernet . . . . . [Off] On
    
```

FTP Port

Description

This menu item sets the FTP server port number.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.
2. For 16 FTP port number, enter 16, and the FTP server port number. Valid values are 1 to 65534. The default is 21.

This example displays 16 FTP port number set to 220.

```

>16, 220
Menu 4. 2. 11 pg 1
01 IP Address (0.0.0.0 - 255.255.255.254)-----010.040.057.015
02 IP Address Range (1 - 255)-----001
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -----255.255.000.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.040.000.001
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----000.000.000.000
06*TCP Default Window Size (200, 512, 1024, 2048)-----200
07*TCP Send Ahead-----OFF
08+SNMP System Parameters
09*Bring passive link down when all calls have cleared-----OFF
10 Passive link Stay Inactive timer-----000060
11 Passive link Standby Mode timer-----000025
12+Link Setup
13+IP Over X.25 Subnets
14+IP Static Routes
15 Telnet port number (1..65534)-----00023
16 FTP port number (1..65534)-----00220
    
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For FTP Port, enter the desired FTP port value. Valid values are from 0 to 65534.

This example displays FTP Port set to 1752.

```

System Menu

System Prompt . . . . . [232]
Destination Menu Break Sequence . . . . . <c><33>
TCP Default Window Size . . . . . [200] 512 1024 2048
TCP Send Ahead . . . . . On [Off]
Telnet Port . . . . . 23
FTP Port . . . . . 1752
    
```

IP Settings

Description

The IP settings are configurable using five menu items in the CLC menu or via a shell command on AI296. The configurable values are:

- IP address
- IP address range
- IP subnet mask
- Primary IP router address
- Secondary IP router address.



Menu Item Types

Data


Configuration in the AI198 Menu System

1. Access Menu 4.2.11.
2. For 01 IP Address, enter **1**, and the IP address for AI296. The default is 000.000.000.000.
3. For 02 IP Address Range, enter **2**, and the number of the IP addresses to be assigned to AI296. The valid range is 1 to 255.
4. For 03 IP Subnet Mask, enter **3**, and the IP subnet mask for AI296. The default is 255.255.255.254.
5. For 04 Primary IP Router Address, enter **4**, and the IP address of the primary router for AI296. The default is 000.000.000.000.
6. For 05 Secondary IP Router Address, enter **5**, and the IP address of the secondary router for AI296. The default is 000.000.000.000.

This example displays:

- 01 IP Address **set to** 10.38.49.12
- 02 IP Address Range **set to** 3
- 03 IP Subnet Mask **set to** 255.255.000.000
- 04 Primary IP Router Address **set to** 010.038.000.001
- 05 IP Router Address **set to** 010.038.000.002

```
>5, 10.38.0.2
Menu 4.2.11 pg 1
01 IP Address (0.0.0.0 - 255.255.255.254)-----010.038.049.012
02 IP Address Range (1 - 255)-----003
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -----255.255.000.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.038.000.001
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.038.000.002
```

 **Note:** For information about configuring IP setting with shell commands, refer to commands [ip on page 9-56](#) and [ip init on page 9-57](#).

Passive Link Settings

Description

The passive link settings are configured using three menu items. The configurable values are:

- **Passive link down state**—Configures standby (DMlock) mode for a passive link. When this feature is turned on, a passive link will go into DMlock mode after all calls have cleared. When turned off, a passive link will stay up when all calls have cleared.
- **Passive link stay inactive timer**—Sets the number of seconds a passive link waits for a connection to come up before failing.
- **Passive link standby mode timer**—Configures the amount of time a link remains in standby mode before it becomes idle. Immediately after a passive link becomes inactive, it goes into the standby (DMlock) mode.

Menu Item Types

Toggle for the `passive link down state`

Data for the `passive link stay inactive timer` and the `passive link standby mode timer`

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.
2. For 09*Bring passive link down when all calls have cleared, enter **9** to select ON or OFF. The default is OFF.
3. For 10 Passive link Stay Inactive timer, enter **10**, and a value in seconds for the passive link stay inactive timer. The minimum value is 25 seconds and the default is 60 seconds.
4. For 11 Passive link Standby Mode timer, enter **11**, and a value in seconds for the passive link standby mode timer. The minimum value is 5 seconds and the default is 25 seconds.

This example displays:

- 09*Bring passive link down when all calls have cleared **set to ON**
- 10 Passive link Stay Inactive timer **set to 50**
- 11 Passive link Standby Mode timer **set to 20**

```

>11, 20
                                                                 Menu 4. 2. 11 pg 1
01 IP Address (0.0.0.0 - 255.255.255.254)-----010.040.057.015
02 IP Address Range (1 - 255)-----001
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -----255.255.000.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.040.000.001
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----000.000.000.000
06*TCP Default Window Size (200, 512, 1024, 2048)----- 200
07*TCP Send Ahead-----OFF
08+SNMP System Parameters
09*Bring passive link down when all calls have cleared----- ON
10 Passive link Stay Inactive timer-----000050
11 Passive link Standby Mode timer-----000020
    
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For Bring passive links down when all calls have cleared, select Yes or No. The default is No.
3. For Time to remain inactive after being brought down, enter a value in seconds. The minimum value is 25 seconds and the default is 60 seconds.
4. For Time to stand by before being brought up, enter a value in seconds. The minimum value is 5 seconds and the default is 25 seconds.

This example displays:

- Bring passive links down when all calls have cleared **set to Yes**
- Time to remain inactive after being brought down **set to 50**
- Time to stand by before being brought up **set to 20**.

```

                                System Menu

System Prompt . . . . . [296]
Destination Menu Break Sequence . . . . . <C>^[1,5]x
TCP Default Window Size . . . . . [200] 512 1024 2048
TCP Send Ahead . . . . . Enabled [Disabled]
Telnet Port . . . . . 23
FTP Port . . . . . 21
10 Base T Ethernet . . . . . [Off] On
Dual Ethernet . . . . . [Off] On
Bring passive links down when all calls have cleared . . . . . [Yes] No
Time to remain inactive after being brought down (sec) . . . . . 50
Time to stand by before being brought up (sec) . . . . . 20
    
```

System Prompt

Description

This item sets the system prompt value in the CLI.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.
2. For 17 Prompt String, enter 17, and the desired system prompt value. There is no default prompt string. The maximum length is 64 characters.

This example displays item 17 Prompt String set to NewPrompt.

```
>17, NewPrompt
Menu 4.2.11 pg 1
01 IP Address (0.0.0.0 - 255.255.255.254)-----010.040.057.015
02 IP Address Range (1 - 255)-----001
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -----255.255.000.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.040.000.001
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----000.000.000.000
06*TCP Default Window Size (200, 512, 1024, 2048)-----200
07*TCP Send Ahead-----OFF
08+SNMP System Parameters
09*Bring passive link down when all calls have cleared----- ON
10 Passive link Stay Inactive timer-----000050
11 Passive link Standby Mode timer-----000020
12+Link Setup
13+IP Over X.25 Subnets
14+IP Static Routes
15 Telnet port number (1..65534)-----00023
16 FTP port number (1..65534)-----00021
17 Prompt String-----NewPrompt
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For System Prompt, enter the desired system prompt.

This example displays System Prompt set to NewPrompt.

```
System Menu
System Prompt . . . . . NewPrompt
```



TCP Settings

Description

The TCP settings are configured using two menu items. The configurable values are:

- TCP default window size—Sets the TCP default window size for AI296. The window size specifies how many bytes AI296 will send to another device or how many bytes another device may send to the AI296 before receiving an acknowledgement.



Note: A small default window size way slow transfers to and from AI296.

- TCP send ahead—Enables or disables AI296's ability to send a TCP window without requiring an acknowledgment. When enabled, acknowledgment is not required. When disabled, acknowledgment is required.

Menu Item Type

Toggle

Configuration in the AI198 Menu System

1. Access System Menu 4.2.11.
2. For 06*TCP Default Window Size, enter 6 to select 200, 512, 1024, or 2048. The default is 200.
3. For 07*TCP Send Ahead, enter 7 to select OFF or ON. The default is OFF.

This example displays 06*TCP Default Window Size set to 1024 and 07*TCP Send Ahead set to ON.

```
>7
Menu 4. 2. 11 pg 1
01 IP Address (0. 0. 0. 0 - 255. 255. 255. 254)-----010. 040. 057. 015
02 IP Address Range (1 - 255)-----001
03 IP Subnet Mask (0. 0. 0. 1 - 255. 255. 255. 254) -----255. 255. 000. 000
04 Primary IP Router Address (0. 0. 0. 0 - 255. 255. 255. 254) -----010. 040. 000. 001
05 Secondary IP Router Address (0. 0. 0. 0 - 255. 255. 255. 254) -----000. 000. 000. 000
06*TCP Default Window Size (200, 512, 1024, 2048)-----1024
07*TCP Send Ahead----- ON
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For TCP Default Window Size, select 200, 512, 1024, or 2048. The default is 200.
3. For TCP Send Ahead, select Enabled or Disabled. The default is Disabled.



This example displays TCP Default Window Size set to 1024 and TCP Send Ahead set to Enabled.

```
System Menu

System Prompt . . . . . NewPrompt
Destination Menu Break Sequence . . . . . <C>^[1,5]x
TCP Default Window Size . . . . . 200 512 [1024] 2048
TCP Send Ahead . . . . . [Enabled] Disabled
```

Telnet Port

Description

This item sets the Telnet port value for AI296.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.
2. For 15 Telnet port number, enter 15, and the desired port number value. Valid values are 1 to 65534. The default is 23.

This example displays 15 Telnet port number set to 122.

```
>15, 122

Menu 4. 2. 11 pg 1
01 IP Address (0.0.0.0 - 255.255.255.254)-----010.040.057.015
02 IP Address Range (1 - 255)-----001
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -----255.255.000.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -----010.040.000.001
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----000.000.000.000
06*TCP Default Window Size (200, 512, 1024, 2048)-----1024
07*TCP Send Ahead----- ON
08+SNMP System Parameters
09*Bring passive link down when all calls have cleared----- ON
10 Passive link Stay Inactive timer-----000050
11 Passive link Standby Mode timer-----000020
12+Link Setup
13+IP Over X.25 Subnets
14+IP Static Routes
15 Telnet port number (1..65534)-----00122
```

Configuration in the AI296 Local Menu System

1. Access the System Menu.
2. For Telnet Port, enter the desired value. The default is 23.



This example displays Telnet Port set to 55.

```
System Menu

System Prompt . . . . . NewPrompt
Destination Menu Break Sequence . . . . . <C>^[1,5]x
TCP Default Window Size . . . . . 200 512 [1024] 2048
TCP Send Ahead . . . . . [Enabled] Disabled
Telnet Port . . . . . 55
```

RADIUS Configuration

RADIUS authentication verifies user login information against valid user information in a database on a centralized RADIUS authentication server. A primary and secondary RADIUS server are configurable to provide secure access for an entire AI296 network. AI296 RADIUS authentication is available for Telnet, asynchronous, and synchronous ports. The following menu items can be configured for RADIUS:

- [Server Settings](#)
- [Shell/FTP Options](#)

Server Settings

Description

The RADIUS server settings are configured using four menu items for the primary and secondary server. The configurable values are:

- Primary/secondary server status—Enables or disables the primary or secondary server.
- Primary/secondary server IP address—Defines an IP address for the primary or secondary server.
- Primary/secondary server port—Defines the port number for the primary or secondary server.
- Primary/secondary server secret—Defines a password for the primary or secondary server.

Menu Item Types

Toggle for primary/secondary server status

Data for primary/secondary server IP address, server port, and server secret

Configuration in the AI198 Menu System



Note: RADIUS and TACACS+ cannot both be configured at the same time. Attempting to do this generates an error.

To configure the RADIUS server settings:

1. Access Menu 4.2.11-2.2.
2. For 01*Primary Server Status, enter **1** to select ENABLED or DI SABLED. The default is DI SABLED.
3. For 02 Pri mary Server IP Address, enter **2**, and the desired IP address. The default is 0. 0. 0. 0.

4. For 03 Primary Server Port, enter 3, and the desired port number. The default is 1812.
5. For 04 Primary Server Secret, enter 4, and the desired password. The default is applied.
6. If desired, repeat steps 2 through 5 for the secondary server settings.

This example displays:

- 01*Primary Server Status set to ENABLED
- 02 Primary Server IP Address set to 050.023.156.012
- 03 Primary Server Port set to 122
- 04 Primary Server Secret set to hi ll top.

```

>4, hi ll top
                                                    Menu 4. 2. 11-2. 2
01*Primary Server Status (Enabl ed, Di sabl ed)----- ENABLED
02 Primary Server IP Address-----050. 023. 156. 012
03 Primary Server Port (1.. 65535)-----00122
04 Primary Server Secret----- hi ll top
    
```

Configuration in the AI296 Local Menu System

1. Access the RAS Configuration Menu located under the System Menu.
2. For RADI US Primary Server Status, select Enabl ed OR Di sabl ed.
3. For IP address, enter an IP address. The default is 0.0.0.0.
4. For Port Number, enter a port number. The default is 1812 for RADIUS servers.
5. For Secret, enter a password. The default is appl i ed.
6. Repeat steps 2 through 5 for the secondary RADIUS server.

This example displays:

- RADI US Primary Server Status set to Enabl ed
- IP Address set to 12.33.57.2
- Port Number set to 122
- Secret set to newone.

```

                                RAS Confi gurati on Menu
RADI US Primary Server Status . . . . . [Enabl ed] Di sabl ed
      IP Address . . . . . 12. 33. 57. 2      Port Number . . . . . 122
      Secret . . . . . newone
    
```

Shell/FTP Options

Description

This item sets the Shell/FTP option for RADIUS as one of the following:

- **Enabled**—Enables RADIUS login.
- **Disabled**—Disables RADIUS login.
- **Local fallback**—Enables RADIUS login, but resorts to local login if the RADIUS login fails.



Note: RADIUS and TACACS+ cannot both be configured at the same time. Attempting to do this generates an error.

Menu Item Type

Toggle

Configuration in the AI198 Menu System

To configure the shell/FTP RADIUS option:

1. Access Menu 4.2.11-2.2.
2. For 09*Shell /FTP Radi us Opti on, enter **9** to select **ENABLED**, **DISABLED**, or **LOCAL FALLBACK**. The default is **DISABLED**.

This example displays 09*Shell /FTP Radi us Opti on set to **LOCAL FALLBACK**.

```
>9
Menu 4.2.11-2.2
01*Primary Server Status (Enabled, Disabled)----- ENABLED
02 Primary Server IP Address-----050.023.156.012
03 Primary Server Port (1..65535)-----00122
04 Primary Server Secret----- hi ll top
05*Secondary Server Status (Enabled, Disabled)-----DI SABLED
06 Secondary Server IP Address-----000.000.000.000
07 Secondary Server Port (1..65535)-----01812
08 Secondary Server Secret----- appl i ed
09*Shell /FTP Radi us Opti on (Enabled, Disabled, Local Fal l back)---LOCAL FALLBACK
```

Configuration in the AI296 Local Menu System

To configure the shell/FTP RADIUS option:

1. Access the RAS Configuration Menu located under the System Menu.
2. For Shell RAS Opti on, select **Disabled**, **RADIUS**, or **RADIUS/Fallback**. The default is **Disabled**.



This example displays the shell RAS option set to RADIUS/Fall back.

```

                                RAS Configuration Menu

RADIUS Primary Server Status . . . . . [Enabled]  Disabled
  IP Address . . . . . 0.0.0.0      Port Number . . . . . 1812
  Secret . . . . . newone

RADIUS Secondary Server Status . . . . . Enabled  [Disabled]
  IP Address . . . . . 0.0.0.0      Port Number . . . . . 1812
  Secret . . . . . applied

Shell RAS Option:      Disabled  RADIUS  [RADIUS/Fall back]
```

TACACS+ Configuration

TACACS+ authentication verifies user login information against the user's permission level on a TACACS+ server. Up to 9 TACACS+ servers are configurable to provide secure access for an entire AI296 network. AI296 TACACS+ authentication is available for Telnet, asynchronous, asynchronous PPP, and FTP connections. The following menu items can be configured for TACACS+ on the AI198 menu system:

- [Server Settings](#)
- [Shell/FTP Options](#)



Note: TACACS+ is not configurable from the AI296 local menu system. For information on configuring TACACS+ when logged into AI296, refer to shell commands [aaa on page 9-6](#), [tacacs on page 9-96](#), and [tacacs server on page 9-99](#).

Server Settings

Description

From the AI198 Menu System, the TACACS+ server settings are configured using four menu items for the primary and secondary server. The configurable values are:

- Primary/secondary server status—Enables or disables the primary or secondary server.
- Primary/secondary server IP address—Defines an IP address for the primary or secondary server.
- Primary/secondary server port—Defines the port number for the primary or secondary server.
- Primary/secondary server secret—Defines a password for the primary or secondary server.

Menu Item Types

Toggle for primary/secondary server status

Data for primary/secondary server IP address, server port, and server secret

Configuration in the AI198 Menu System

To configure the TACACS+ server settings:

1. Access Menu 4.2.11-2.4.
2. For 01*Primary Server Status, enter 1 to select ENABLED or DI SABLED. The default is DI SABLED.

3. For 02 Primary Server IP Address, enter 2, and the IP address. The default is 0.0.0.0.
4. For 03 Primary Server Port, enter 3, and the port number. The default is 49.
5. For 04 Primary Server Secret, enter 4, and the password. The default is applied.
6. Repeat steps 2 through 5 for the secondary server settings.

This example displays:

- 01*Primary Server Status set to ENABLED
- 02 Primary Server IP Address set to 050.023.156.011
- 03 Primary Server Port set to 122
- 04 Primary Server Secret set to hilltop.

```
>4, hilltop
Menu 4.2.11-2.4
01*Primary Server Status (Enabled, Disabled)----- ENABLED
02 Primary Server IP Address-----050.023.156.012
03 Primary Server Port (1..65535)-----00122
04 Primary Server Secret----- hilltop
```

Shell/FTP Options

Description

This item sets the Shell/FTP option for TACACS+ as one of the following:

- Enabled—Enables TACACS+ login.
- Disabled—Disables TACACS+ login.
- Local fallback—Enables TACACS+ login, but resorts to local login if the TACACS+ login fails.



Note: RADIUS and TACACS+ cannot both be configured at the same time. Attempting to do this generates an error.

Menu Item Type

Toggle

Configuration in the AI198 Menu System

Important: Configuration of the shell/FTP TACACS+ option results in privilege level authorization and supersedes any TACACS+ configuration on the AI296 card.

To configure the shell/FTP TACACS+ option:

1. Access Menu 4.2.11-2.4.

2. For 09*Shell/FTP TACACS Option, enter **9** to select ENABLED, DISABLED, or LOCAL FALLBACK. The default is DISABLED.

This example displays 09*Shell/FTP TACACS Option set to LOCAL FALLBACK.

```
>9
Menu 4.2.11-2.4
01*Primary Server Status (Enabled, Disabled)-----DISABLED
02 Primary Server IP Address-----000.000.000.000
03 Primary Server Port (1..65535)-----00049
04 Primary Server Secret-----appl i ed
05*Secondary Server Status (Enabled, Disabled)-----DISABLED
06 Secondary Server IP Address-----000.000.000.000
07 Secondary Server Port (1..65535)-----00049
08 Secondary Server Secret-----appl i ed
09*Shell/FTP TACACS Option (Enabled, Disabled, Local Fal l back)---LOCAL FALLBACK
```

SNMP Configuration

This section discusses SNMP configuration options. The following configuration components are available:

- [Authentication Traps](#)
- [Community Names](#)
- [Contact Persons](#)
- [Node Information](#)
- [SNMP Manager](#)

Authentication Traps

Description

This item enables or disables the generation of authentication failure traps by AI296. When a user enters faulty login information, authentication traps are sent from an SNMP agent to inform the management station about the incorrect login attempt.

Menu Item Types

Toggle

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.8.
2. For 04*Send authentication traps, enter 4 to select ON or OFF. The default is ON.

The following example displays item 04*Send authentication traps set to ON.

```
>4
Menu 4. 2. 11. 8
01 Contact person for this node-----
02 Node name-----
03 Node location-----
04*Send authentication traps----- ON
```

AI296 Local Menu Item Configuration

1. Access the SNMP Menu located under the System Menu.
2. For Send authentication traps, select On or Off. The default is ON.

The following example displays the selection of `On` for menu item `Send authentication traps`.

```
SNMP Menu
Contact person for this managed node . . . . .
Node name . . . . .
Node location . . . . .
Send authentication traps . . . . . [On] Off
```

Community Names

Description

SNMP community names provide embedded password access to MIB contents. There are three menu items available for configuring AI296 SNMP community name information:

- `Read Community Name`—Sets the name that permits read only access to all objects in the MIB.
- `MIB2 Read Community Name`—Sets the name that permits read only access to all objects in MIB2.
- `Write Community Name`—Sets the name that permits read and write access to all objects in the MIB.

Menu Item Types

Data for all menu items

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.8.
2. For `05 Read Community Name`, enter **5**, and the community name value. The maximum length is 32 characters. The default value is `readonly`.
3. For `06 MIB2 Read Community Name`, enter **6**, and the community name value. The maximum length is 32 characters. The default value is `public`.
4. For `07 Write Community Name`, enter **7**, and the community name value. The maximum length is 32 characters. The default value is `administrator`.

The following example displays:

- Item 05 Read Community Name **set to** ReadComm.
- Item 06 MIB2 Read Community Name **set to** MIB2.
- Item 07 Write Community Name **set to** WriteComm.

```

>7, WriteComm
Menu 4.2.11.8
01 Contact person for this node-----
02 Node name-----
03 Node location-----
04*Send authentication traps----- ON
05 Read Community Name-----ReadComm
06 MIB2 Read Community Name-----MIB2
07 Write Community Name-----WriteComm
    
```

AI296 Local Menu Item Configuration

1. Access the SNMP Menu located under the System Menu.
2. For menu item Read Community Name, enter the community name value. The maximum length is 32 characters. The default value is readonly.
3. For menu item MIB2 Read Community Name, enter the community name value. The maximum length is 32 characters. The default value is public.
4. For menu item Write Community Name, enter the community name value. The maximum length is 32 characters. The default value is administrator.

The following example displays:

- Item Read Community Name **set to** ReadComm.
- Item MIB2 Read Community Name **set to** MIB2.
- Item Write Community Name **set to** WriteComm.

```

SNMP Menu
Contact person for this managed node . . . . .
Node name . . . . .
Node location . . . . .
Send authentication traps . . . . . [On] Off
SNMP Manager #1 . . . . . 10.35.0.30
SNMP Manager #2 . . . . . 10.35.0.60
SNMP Manager #3 . . . . . 10.35.0.20
SNMP Manager #4 . . . . . 0.0.0.0
SNMP Manager #5 . . . . . 0.0.0.0
Read Community Name . . . . . ReadComm
MIB2 Read Community Name . . . . . MIB2
Write Community Name . . . . . WriteComm
    
```

Contact Persons

Description

This item defines the name of the person to contact regarding a specific node.

Menu Item Types

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.8.
2. For 01 Contact person for this node, enter 1, and the desired contact person. The maximum length is 40 characters.

The following example displays John Doe configured for menu item 01 Contact person for this node:

```
>1, John Doe
Menu 4. 2. 11. 8
01 Contact person for this node-----John Doe
```

AI296 Local Menu Item Configuration

1. Access the SNMP Menu located under the System Menu.
2. For Contact person for this managed node, enter the contact person. The maximum length is 40 characters.

The following example displays John Doe configured for menu item Contact person for this managed node:

```
SNMP Menu
Contact person for this managed node . . . . . John Doe
```

Node Information

Description

There are two menu items available for configuring node information:

- Node Name—Defines the name of a location on a network.
- Node Location—Defines a location on a network.

Menu Item Types

Data



Configuration in the AI198 Menu System

1. Access Menu 4.2.11.8.
2. For 02 Node name, enter 2, and the node name. The maximum length is 40 characters.
3. For 03 Node Location, enter 3, and a node location description. The maximum length is 40 characters.

The following example displays the configuration of node name `newNode` and node location `Office B`.

```

>3,Office B
                                                    Menu 4.2.11.8
01 Contact person for this node-----John Doe
02 Node name-----newNode
03 Node Location-----Office B
    
```

AI296 Local Menu Item Configuration

1. Access the SNMP Menu located under the System Menu.
2. For Node name, enter the node name. The maximum length is 40 characters.
3. For Node Location, enter a node location description. The maximum length is 40 characters.

The following example displays the configuration of node name `newNode` and node location `Office B`.

```

SNMP Menu

Contact person for this managed node . . . . . John Doe
Node name . . . . . newNode
Node Location . . . . . Office B
    
```

SNMP Manager

Description

An SNMP manager is a combination of monitoring software running on a network management station (NMS) and the actual device running the software. It collects and acts on information from the various devices being monitored and/or controlled. The SNMP manager also periodically polls the devices it is managing to get status information. AI296 allows for the configuration of up to 5 SNMP managers.



Note: SNMP managers are only configurable when AI296 is in standalone mode. They are not configurable through the AI198 menu system.



Menu Item Types

Data

AI296 Local Menu Item Configuration

1. Access the SNMP Menu located under the System Menu.
2. For **SNMP Manager #1**, enter the IP address of the first SNMP manager. The default is 0. 0. 0. 0.
3. For **SNMP Manager #2**, enter the IP address of the second SNMP manager. The default is 0. 0. 0. 0.
4. For **SNMP Manager #3**, enter the IP address of the third SNMP manager. The default is 0. 0. 0. 0.
5. For **SNMP Manager #4**, enter the IP address of the fourth SNMP manager. The default is 0. 0. 0. 0.
6. For **SNMP Manager #5**, enter the IP address of the fifth SNMP manager. The default is 0. 0. 0. 0.

The following example displays:

- **SNMP Manager #1 set to 10. 65. 32. 4**
- **SNMP Manager #2 set to 10. 65. 32. 5**
- **SNMP Manager #3 set to 10. 65. 32. 6**
- **SNMP Manager #4 set to 10. 65. 32. 7**
- **SNMP Manager #5 set to 10. 65. 32. 8**

SNMP Menu	
Contact person for this managed node	
Node name	
Node location	
Send authentication traps	[On] Off
SNMP Manager #1	10. 65. 32. 4
SNMP Manager #2	10. 65. 32. 5
SNMP Manager #3	10. 65. 32. 6
SNMP Manager #4	10. 65. 32. 7
SNMP Manager #5	10. 65. 32. 8

Static Route Configuration

AI296 allows for the configuration of static routes using both the AI198 and AI296 menu systems.

IP Address Settings

Description

Static routes are configured with a destination and next hop IP address. The destination IP address defines the static IP route you want to configure. The next hop IP address defines the IP address of the router you want the system to use when trying to reach the destination IP address.

Menu Item Types

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.14.
2. From Menu 4.2.11.14, enter a value from 3 to 11. Menu 4.2.11.14.1 appears.
3. For 01 Destination IP, enter an IP address value.
4. For 02 Next Hop IP, enter an IP address value.

The following example displays the configuration of destination address 84. 238. 45. 2 and next hop address 23. 51. 93. 5.

```
>2, 023. 051. 093. 005
Menu 4. 2. 11. 14. 1
01 Destination IP-----084. 238. 045. 002
02 Next Hop IP-----023. 051. 093. 005
```

AI296 Local Menu Item Configuration

1. Access the Static Route Menu.
2. Select [Add]. The IP Static Route Edit Menu appears.
3. For Destination IP Address, enter an IP address value. The default is 1. 1. 1. 1.
4. For Next Hop IP Address, enter an IP address value. The default is 1. 1. 1. 1.

The following example displays the configuration of destination IP address 12. 240. 54. 3 and next hop IP address 12. 240. 54. 4.

```
IP Static Route Edit Menu
Destination IP Address . . . . . 12. 240. 54. 3
Next Hop IP Address . . . . . 12. 240. 54. 4
```

TID to Modem Mux Configuration

The following are available:

- [Inactivity Timeout](#)
- [Initialization String](#)
- [Port Bit Settings](#)
- [TID to Route](#)

Inactivity Timeout

Description

This menu item defines the amount of time (in seconds) the Modem Mux connection must be inactive before it times out.

Menu Item Types

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.14-2.6.
2. From Menu 4.2.14-2.6, enter a value from 2 to 11. Menu 4.2.14-2.6.1 appears.
3. For 06 Inacti vi ty Ti meout, enter 6, and a timeout value. Valid values are from 0 to 100000. The default is 300.

This example displays 06 Inacti vi ty Ti meout set to 1500.

```
>6, 1500
Menu 4. 2. 14-2. 6. 1
01 TID to route-----
02*Port Data Bi ts (7, 8)-----8
03*Port Stop Bi ts (1, 2)-----1
04*Port Parity (None, Even, Odd)-----None
05 Ini t Stri ng-----
06 Inacti vi ty Ti meout (0 - 100000)-----001500
```

AI296 Local Menu Item Configuration

1. Access the TID to Modem Mux Menu located under the System Menu.
2. From the TID to Modem Mux Summary Menu, select [Add TID]. The TID To Modem Mux Edit Menu appears.
3. For Inacti vi ty Ti meout, enter a timeout value. Valid values are from 0 to 100000. The default is 300.

This example displays `Inacti vi ty Ti meout` set to 1500.

```

TID To Modem Mux Edi t Menu
TID to route . . . . .
Port Data Bi ts . . . . . Seven [Ei ght]
Port Stop Bi ts . . . . . [One] Two
Port Pari ty . . . . . [None] Even Odd
Ini t String . . . . .
Inacti vi ty Ti meout . . . . . 1500
    
```

Initialization String

Description

This menu item defines the string that is sent upon indication that there is a device connected to the port (DSR asserted).

Menu Item Types

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.14-2.6.
2. From Menu 4.2.14-2.6, enter a value from 2 to 11. Menu 4.2.14-2.6.1 appears.
3. For `05 Ini t String`, enter 5, and an initialization string value. Maximum length is 30 characters.

This example displays `05 Ini t String` set to `conn23`.

```

>5, conn23
Menu 4. 2. 14-2. 6. 1
01 TID to route-----
02*Port Data Bi ts (7, 8)-----8
03*Port Stop Bi ts (1, 2)-----1
04*Port Pari ty (None, Even, Odd)-----None
05 Ini t Stri ng----- conn23
    
```

AI296 Local Menu Item Configuration

1. Access the TID to Modem Mux Menu located under the System Menu.
2. From the TID to Modem Mux Summary Menu, select `[Add TID]`. The TID To Modem Mux Edit Menu appears.
3. For `Ini t String`, enter a string value. Maximum length is 30 characters.

This example displays `Init String` set to `conn23`.

```
TID To Modem Mux Edit Menu
TID to route . . . . .
Port Data Bits . . . . . Seven [Ei ght]
Port Stop Bits . . . . . [One] Two
Port Pari ty . . . . . [None] Even Odd
Init String . . . . . conn23
```

Port Bit Settings

Description

There are three menu items available for configuring TID to Modem Mux port bits:

- `Port Data Bits`—Defines the number of databits in a data byte.
- `Port Stop Bits`—Defines the number of stop bits for TID to Modem Mux. A stop bit is an extra bit at the end of an asynchronous character that helps the receiver recognize the end of the character.
- `Port Pari ty`—Defines parity, which is a process for detecting whether or not bits of data have been altered during data transmission.

Menu Item Types

Toggle for all menu items

Configuration in the AI198 Menu System

1. Access Menu 4.2.14-2.6.
2. From Menu 4.2.14-2.6, enter a value from 2 to 11. Menu 4.2.14-2.6.1 appears.
3. For 02*Port Data Bits, enter 2, to select 7 or 8. The default is 8.
4. For 03*Port Stop Bits, enter 3, to select 1 or 2. The default is 1.
5. For 04*Port Pari ty, enter 4, to select None, Even, or Odd. The default is None.

This example displays:

- 02*Port Data Bits set to 7
- 03*Port Stop Bits set to 1
- 04*Port Pari ty set to Even.

```
>4, Even
Menu 4.2.14-2.6.1
01 TID to route-----
02*Port Data BI ts (7, 8)-----7
03*Port Stop BI ts (1, 2)-----1
04*Port Pari ty (None, Even, Odd)-----Even
```




AI296 Local Menu Item Configuration

1. Access the TID to Modem Mux Menu located under the System Menu.
2. From the System Menu, select TID to Modem Mux. The TID to Modem Mux Summary Menu appears.
3. From the TID to Modem Mux Summary Menu, select [Add TID]. The TID To Modem Mux Edit Menu appears.
4. For Port Data Bits, select 7 or 8. The default is 8.
5. For Port Stop Bits, select 1 or 2. The default is 1.
6. For Port Parity, select None, Even, or Odd. The default is None.

This example displays:

- Port Data Bits set to 7
- Port Stop Bits set to 1
- Port Parity set to Even.

```

TID To Modem Mux Edit Menu
TID to route . . . . .
Port Data Bits . . . . . [Seven] Eight
Port Stop Bits . . . . . [One] Two
Port Parity . . . . . None [Even] Odd
```

TID to Route

Description

This menu item defines the string that represents the TID to be routed to the Modem Mux link.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.14-2.6.
2. From Menu 4.2.14-2.6, enter a value from 2 to 11. Menu 4.2.14-2.6.1 appears.
3. For 01 TID to route, enter 1, and the desired TID. Maximum length is 20 characters.

This example displays the TID configured as COLUMBUS-OH.

```

>1 col umbus-oh
01 TID to route----- Menu 4.2.14-2.6.1
                                COLUMBUS-OH
```

AI296 Local Menu Item Configuration

1. Access the TID to Modem Mux Menu located under the System Menu.
2. From the TID to Modem Mux Summary Menu, select [Add TID]. The TID To Modem Mux Edit Menu appears.
3. For TID to route, enter the desired TID. Maximum length is 20 characters.

This example displays the TID configured as COLUMBUS-OH.

TID To Modem Mux Edit Menu	
TID to route	COLUMBUS-OH

Time Configuration

AI296 supports the Simple Network Time Protocol (SNTP). SNTP is a time protocol that maintains a common time among Internet hosts.



Note: Time configuration options are only available when AI296 is operating in standalone mode.

The following configuration items are available:

- [Daylight Savings Time](#)
- [SNTP Settings](#)
- [Time Zone](#)

Daylight Savings Time

Description

There are eight menu items available for configuring Daylight Savings Time:

- **Start On** and **End On**—Configures the numbered day to start or end Daylight Savings Time.
- **Start Day** and **End Day**—Configures the day of the week to start or end Daylight Savings Time.
- **Start Month** and **End Month**—Configures the month to start or end Daylight Savings Time.
- **Start Hour** and **End Hour**—Configures the hour of the day to start or end Daylight Savings Time.

Menu Item Types

Toggle

AI296 Local Menu Item Configuration

1. Access the System Menu.
2. From the System Menu, select **Time Menu**. The Time Menu appears.
3. For **Daylight Saving Time on this host is**, select **Enabled OR Disabled**.
4. For **Start On**, select the day number in the month that Daylight Savings Time will start.
5. For **Start Day**, select the day that Daylight Savings Time will start.
6. For **Start Month**, select the month that Daylight Savings Time will start.

7. For `Start Hour`, select the hour that Daylight Savings Time will start.
8. For `End On`, select the day number in the month that Daylight Savings Time will end.
9. For `End Day`, select the day that Daylight Savings Time will end.
10. For `End Month`, select the month that Daylight Savings Time will end.
11. For `End Hour`, select the hour that Daylight Savings Time will end.

This following example displays:

- Daylight Saving Time on this host is set to Enabled
- Start On set to Second
- Start Day set to Sun
- Start month set to 3
- Start Hour set to 2
- End On set to First
- End Day set to Sun
- End month set to 11
- End Hour set to 2.

```
Time Menu
Current Time Zone (+/-hh:mm) . . . . . +00:00
Daylight Saving Time on this host is . . . . . [Enabled] Disabled
Start On . . . . . First [Second] Third Fourth Last
Start Day . . . . . [Sun] Mon Tue Wed Thur Fri Sat
Start Month (1-12, 1=Jan, 12=Dec) . . . . . 3
Start Hour (0-23) . . . . . 2

End On . . . . . [First] Second Third Fourth Last
End Day . . . . . [Sun] Mon Tue Wed Thur Fri Sat
End Month (1-12, 1=Jan, 12=Dec) . . . . . 11
End Hour (0-23) . . . . . 2
```

SNTP Settings

Description

SNTP is a time protocol that maintains a common time among Internet hosts. There are 4 menu items available for configuring SNTP settings:

- SNTP client on this host is—Enables or disables SNTP. If `Enabled` is selected, the system attempts to contact the primary and secondary SNTP servers for the exact time. If AI296 is unable to contact either the primary or secondary SNTP server, it uses the local time maintained by AI296. If `Disabled` is selected, the system uses the local time maintained by AI296.

- Primary SNTP Server—Defines the IP address of the first SNTP server from which AI296 will attempt to retrieve the exact time.
- Secondary SNTP Server—Defines the IP address of the second SNTP server from which AI296 will attempt to retrieve the exact time.



Note: The SNTP client must be enabled before the primary or secondary SNTP server can be defined.

- SNTP Poll Interval (minutes)—Defines the time interval (in minutes) for AI296 to poll the SNTP servers.

Menu Item Types

Toggle for SNTP client on this host is

Data for Primary SNTP Server, Secondary SNTP Server, and SNTP Poll Interval (minutes) settings

AI296 Local Menu Item Configuration

1. Access the Time Menu located under the System Menu.
2. For SNTP client on this host is, select Enabled or Disabled. The default is Enabled.
3. For Primary SNTP Server, enter the primary server IP address. The default is 0.0.0.0.
4. For Secondary SNTP Server, enter the secondary server IP address. The default is 0.0.0.0.
5. For SNTP Poll Interval (minutes), enter the time in minutes for the SNTP servers to be polled. The default is 10.

This following example displays:

- SNTP client on this host is set to Enabled
- Primary SNTP Server set to 12.43.167.59
- Secondary SNTP Server set to 12.43.167.60
- SNTP Poll Interval (minutes) set to 7.

```

Time Menu

Current Time Zone (+/-hh:mm) . . . . .+00:00
Daylight Saving Time on this host is . . . . . [Enabled] Disabled

SNTP client on this host is . . . . . [Enabled] Disabled
Primary SNTP Server . . . . . 12.43.167.59
Secondary SNTP Server . . . . . 12.43.167.60
SNTP Poll Interval (minutes) . . . . . 7
    
```

Time Zone

Description

This menu item configures the time zone for AI296 to use. The configured value represents the number of hours you are from UTC.

Menu Item Types

Data

AI296 Local Menu Item Configuration

1. Access the Time Menu located under the System Menu.
2. For `Current Time Zone (+/-hh:mm)`, enter the time zone you want AI296 to use:
 - For +/-, enter the direction (+ = east) (- = west) of Universal Coordinated Time (UTC) or Greenwich Mean Time.
 - For hh, enter the number of hours.
 - For mm, enter the number of minutes.



Note: The time entered is the number of hours you are from UTC. For example, if you are located in the Eastern Standard Time (EST) zone, you would enter -05:00 in this field. This indicates that you are 5 hours behind UTC.

This example displays a time zone configuration of -05:00.

Time Menu	
Current Time Zone (+/-hh:mm)	-05:00

IP Over X.25 Subnet Configuration

This chapter provides information on configuring the encapsulation of the IP protocol over X.25 (IXE) networks.

Guide to this Chapter

[Configuration Overview](#)

[Local Settings](#)

[Remote Settings](#)

Configuration Overview

AI296 supports encapsulation of the IP protocol over X.25 (IXE) networks. The local AI296 wraps IP packets (either control or data packets) inside of X.25 frames and sends them across the X.25 network. The remote AI296 receives the X.25 frames and unwraps the IP packets.

To allow IP traffic to run over an X.25 network, the network must be configured to support IP over X.25 encapsulation. To do this, complete the following tasks:

- Configure and verify the X.25 SVC links. Refer to section [SVC Configuration Settings on page 6-90](#) for information about configuring X.25 SVC links.
- Create IP subnets and IP over X.25 remote pairs.
- Create IP static routing table entries (optional).
- Reset AI296.

Before Configuration

In order for the TCP/IP stack to know where to route incoming packets, an appropriate subnet must be configured. IP addresses and subnets must be assigned to the local and remote sides of the X.25 link (also called "doorway"). X.121 addresses are then assigned to the local and remote sides. After this, a static route can be setup through the IXE link to the remote doorway IP address. Refer to the example in [Figure 5-1 on page 5-2](#) for an illustration of how to configure IP over X.25.

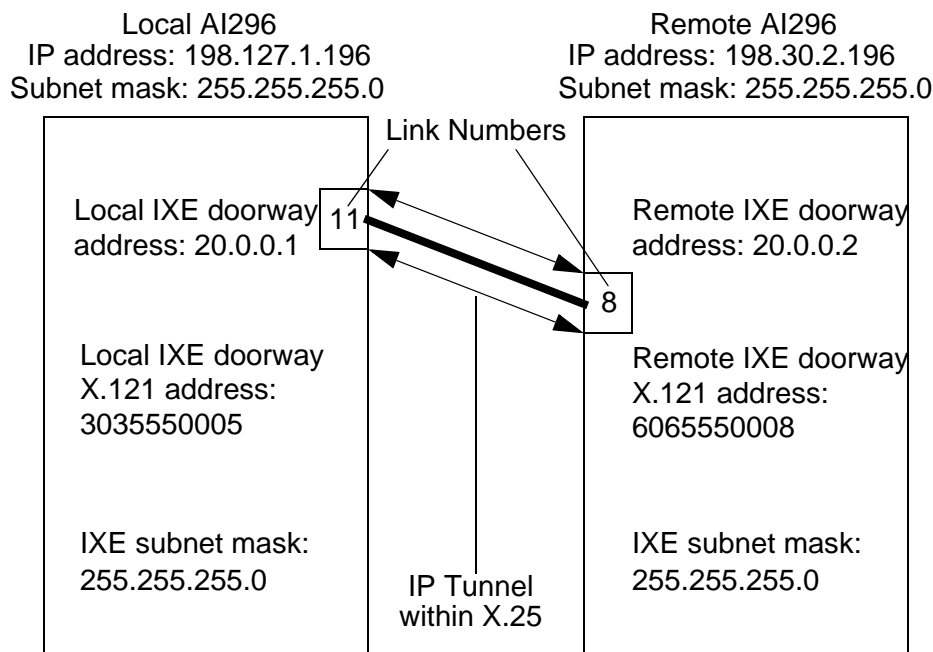


Figure 5-1 IXE Example



Local Settings

IXE can be configured using either one local and one remote AI296 or one local AI296 and a router that supports IP over X.25. The following configuration components are available:

- [Local IP Address for this Subnet](#)
- [Local IP Subnet Mask](#)
- [Local X.25 Link Number](#)

Local IP Address for this Subnet

Description

This menu item configures the local IXE doorway address for the subnet.



Note: This address is not the same as the local AI296 IP address.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.13. This menu displays a list of all the configured IP over X.25 subnets.
2. From Menu 4.2.11.13, enter a value (02 through 11) associated with the IP over X.25 subnet to be configured. Menu 4.2.11.13.1 appears.
3. For 01 Local IP address for this subnet, enter the subnet IP address value. The default is 0.0.0.0.

This example displays 01 Local IP address for this subnet set to 24.35.132.67.

```
>1, 24. 35. 132. 67
Menu 4. 2. 11. 13. 1
01 Local IP address for this subnet-----024. 035. 132. 067
```

Configuration in the AI296 Local Menu System

1. Access the IP Over X.25 Subnet Menu.
2. From the IP Over X.25 Subnet Menu, select Add. The IP Over X.25 Subnet Edit Menu appears.
3. For Local IP Address for this Subnet, enter the subnet IP address value.



This example displays Local IP Address for this Subnet set to 24.35.132.67.

```
IP Over X.25 Subnet Edit Menu
Local IP Address for this Subnet . . . . . 24.35.132.67
```

Local IP Subnet Mask

Description

This menu item configures the local IXE doorway IP subnet mask.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.13. This menu displays a list of all the configured IP over X.25 subnets.
2. From Menu 4.2.11.13, enter a value (02 through 11) associated with the IP over X.25 subnet to be configured. Menu 4.2.11.13.1 appears.
3. For 02 Local IP Mask for this subnet, enter the subnet IP subnet mask value. The default is 255.255.255.252.

This example displays 02 Local IP Mask for this subnet set to 255.255.0.0.

```
>2, 255.255.0.0
Menu 4.2.11.13.1
01 Local IP address for this subnet-----024.035.132.067
02 Local IP Mask for this subnet-----255.255.000.000
```

Configuration in the AI296 Local Menu System

1. Access the IP Over X.25 Subnet Menu.
2. From the IP Over X.25 Subnet Menu, select Add. The IP Over X.25 Subnet Edit Menu appears.
3. For Local IP Mask for this Subnet, enter the subnet IP subnet mask value. The default is 255.255.255.252.

This example displays Local IP Mask for this Subnet set to 255.255.0.0.

```
IP Over X.25 Subnet Edit Menu
Local IP Address for this Subnet . . . . . 0.0.0.0
Local IP Mask for this Subnet . . . . . 255.255.0.0
```



Local X.25 Link Number

Description

This menu item configures the local IXE doorway link number.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.13. This menu displays a list of all the configured IP over X.25 subnets.
2. From Menu 4.2.11.13, enter a value (02 through 11) associated with the IP over X.25 subnet to be configured. Menu 4.2.11.13.1 appears.
3. For 03 Local X.25 Link number, enter **3**, and the link number. Valid values are 1 to 16. The default is 1.

This example displays 03 Local X.25 Link number set to 12.

```
>3, 12
Menu 4. 2. 11. 13. 1
01 Local IP address for this subnet-----024. 035. 132. 067
02 Local IP Mask for this subnet-----255. 255. 000. 000
03 Local X. 25 Link number-----12
```

Configuration in the AI296 Local Menu System

1. Access the IP Over X.25 Subnet Menu.
2. From the IP Over X.25 Subnet Menu, select Add. The IP Over X.25 Subnet Edit Menu appears.
3. For Local X.25 Link number, enter the link number. The default is 1.

This example displays Local X.25 Link number set to 12.

```
IP Over X.25 Subnet Edit Menu
Local IP Address for this Subnet . . . . . 0.0.0.0
Local IP Mask for this Subnet . . . . . 255.255.255.252
Local X.25 Link number . . . . . 12
```

Remote Settings

IXE can be configured using either one local and one remote AI296 or one local AI296 and a router that supports IP over X.25. The following configuration components are available:

- [Remote IP Address for this Subnet](#)
- [Remote X.121 Address](#)

Remote IP Address for this Subnet

Description

This menu item configures the remote IXE IP address for the subnet.



Note: This address is not the same as the remote AI296 (or router) IP address.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.13. This menu displays a list of all the configured IP over X.25 subnets.
2. From Menu 4.2.11.13, enter a value (02 through 11) associated with the IP over X.25 subnet to be configured. Menu 4.2.11.13.1 appears.
3. For 04 Remote IP address for this subnet, enter the remote IP address value. The default is 0.0.0.0.

This example displays 04 Remote IP address for this subnet set to 36.82.234.54.

```
>4, 36. 82. 234. 54
Menu 4. 2. 11. 13. 1
01 Local IP address for this subnet-----000.000.000.000
02 Local IP Mask for this subnet-----255.255.255.252
03 Local X.25 link number-----01
04 Remote IP address for this subnet-----036.082.234.054
```

Configuration in the AI296 Local Menu System

1. Access the IP Over X.25 Subnet Menu.
2. From the IP Over X.25 Subnet Menu, select Add. The IP Over X.25 Subnet Edit Menu appears.
3. For Remote IP Address for this Subnet, enter the remote IP address value. The default is 0.0.0.0.

This example displays Remote IP Address for this Subnet set to 93.67.158.56.

```
IP Over X.25 Subnet Edit Menu

Local IP Address for this Subnet . . . . . 0.0.0.0
Local IP Mask for this Subnet . . . . . 255.255.255.252
Local X.25 link number . . . . . 0
Remote IP Address for this Subnet . . . . . 93.67.158.56
```

Remote X.121 Address

Description

This menu item configures the IXE remote X.121 address. Each IXE connection must have a unique local/remote X.121 address pair. This means there cannot be two separate IXE connections in the same AI296 with the same local X.121 address and the same remote X.121 address.



Note: X.121 addresses are assigned per link on AI296, not per SVC.

Menu Item Type

Data

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.13. This menu displays a list of all the configured IP over X.25 subnets.
2. From Menu 4.2.11.13, enter a value (02 through 11) associated with the IP over X.25 subnet to be configure. Menu 4.2.11.13.1 appears.
3. For 05 Remote X121 address, enter 5, and the remote address value. Maximum length is 15 characters.

This example displays 05 Remote X121 address set to 6505550043.

```
>5, 6505550043

Menu 4. 2. 11. 13. 1
01 Local IP address for this subnet-----000.000.000.000
02 Local IP Mask for this subnet-----255.255.255.252
03 Local X.25 link number-----01
04 Remote IP address for this subnet-----036.082.234.054
05 Remote X121 address-----6505550043
```

Configuration in the AI296 Local Menu System

1. Access the IP Over X.25 Subnet Menu.
2. From the IP Over X.25 Subnet Menu, select **Add**. The IP Over X.25 Subnet Edit Menu appears.
3. For Remote X121 Address, enter the remote address value.

This example displays Remote X121 Address **set to 6505550043**.

```
IP Over X.25 Subnet Edit Menu
Local IP Address for this Subnet . . . . . 0.0.0.0
Local IP Mask for this Subnet . . . . . 255.255.255.252
Local X.25 link number . . . . . 0
Remote IP Address for this Subnet . . . . . 93.67.158.56
Remote X121 Address . . . . . 6505550043
```

Link Configuration

This chapter provides information on configuring AI296 links in the AI198 and AI296 local menu systems.

Guide to this Chapter

[AI296 Link Types](#)

[BX.25 Configuration](#)

[Connect Options Configuration](#)

[Disconnect Options Configuration](#)

[General Link Properties Configuration](#)

[General PPP Properties Configuration](#)

[LAPB Parameters Configuration](#)

[Modem Option Configuration](#)

[PPP Authentication Configuration](#)

[Quick X.25 Configuration](#)

[RTS/DTR Lead Control Configuration](#)

[X.25 Parameters Configuration](#)

[Virtual Circuit Configuration](#)

AI296 Link Types

AI296 has six configurable link types:

- [Asynchronous](#)
- [Asynchronous PPP](#)
- [HDLC-Bridge](#)
- [MLT](#)
- [Synchronous PPP](#)
- [X.25](#)

Asynchronous

Asynchronous links use asynchronous transmission and support multiple baud rates, parity types, stop bits, and software flow or hardware control.

See Also

- [Connect Options Configuration](#)
- [Disconnect Options Configuration](#)
- [General Link Properties Configuration](#)
- [Modem Option Configuration](#)
- [RTS/DTR Lead Control Configuration](#)

Asynchronous PPP

Asynchronous PPP links use PPP (point-to-point protocol) and asynchronous transmission. They support PAP and CHAP for authentication and can be set as bridged (BCP) or routed (IPCP) interfaces.

See Also

- [Connect Options Configuration](#)
- [Disconnect Options Configuration](#)
- [General Link Properties Configuration](#)
- [General PPP Properties Configuration](#)
- [Modem Option Configuration](#)
- [PPP Authentication Configuration](#)
- [RTS/DTR Lead Control Configuration](#)

HDLC-Bridge

HDLC-Bridge links run with an HDLC link layer protocol in Asynchronous Balanced Mode and bridge Ethernet frames. HDLC-Bridge links can provide clocking or synchronize with an external clock.

See Also

[General Link Properties Configuration](#)

MLT

MLT links are designed for interfacing with the metallic loop testing switch application found in telephone switch networks. This application consists of proprietary messages transported using LAPB. The MLT link type enables the transporting of proprietary messages across an IP network. LAPB is terminated on AI296 and the data is transported to a remote end point using another transport protocol, such as TCP/IP.

See Also

- [General Link Properties Configuration](#)
- [LAPB Parameters Configuration](#)
- [General PPP Properties Configuration](#)
- [PPP Authentication Configuration](#)

Synchronous PPP

Synchronous PPP links use PPP (point-to-point protocol) and synchronized transmission. They can provide clocking or synchronize with an external clock. Synchronous PPP links support PAP and CHAP for authentication and can be set as bridged (BCP) or routed (IPCP) interfaces.

See Also

- [General Link Properties Configuration](#)
- [General PPP Properties Configuration](#)
- [PPP Authentication Configuration](#)

X.25


X.25 links provide a synchronous connection to a packet-switched X.25 network. X.25 links can behave as DTE or DCE and can provide clocking or synchronize with an external clock. X.25 links support both PVC and SVC calls and allow configuration of a variety of LAPB and X.25 protocol settings.

See Also

- [BX.25 Configuration](#)
- [General Link Properties Configuration](#)
- [LAPB Parameters Configuration](#)
- [Quick X.25 Configuration](#)
- [X.25 Parameters Configuration](#)

BX.25 Configuration

AI296 is BX.25 compatible and implements passive links. Passive links are not a part of the BX.25 protocol. Once a passive link is active, it uses the BX.25 protocol.

 **Notes:** BX.25 is supported on only one link per AI296.

 Some BX.25 parameters may vary based on the AI296 installation.

The following configuration components are available:

- [BX.25 Configuration Values Usage](#)
- [BX.25 Modulo](#)
- [BX.25 Support](#)
- [BX.25 Timer Settings](#)

BX.25 Configuration Values Usage

Description

This menu item enables or disables the use of the values configured in the BX.25 menu.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 02*Use these configuration values, enter 2 to select Enabled or Disabled. The default is Enabled.

This example displays 02*Use these configuration values set to Enabled.

```
>2
Menu 4.2.11.12.11
01*BX25 Support (Enabled, Disabled)----- Enabled
02*Use these configuration values (Enabled, Disabled)----- Enabled
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select BX.25 Menu. The BX.25 Menu appears.
3. For Use BX.25 Configuration Values, select Enabled or Disabled. The default is Enabled.

This example displays Use BX.25 Configuration Values set to Enabled.

```

                                     BX.25 Menu
Link being configured . . . . . 03
BX.25 Support . . . . . [Enabled] Disabled
Use BX.25 Configuration Values. . . . . [Enabled] Disabled

```

BX.25 Modulo

Description

This menu item defines a modulo value. A modulo is used by the BX.25 protocol to define the value at which the packet sequence numbers will rollover.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 04 Modulo, enter 4, and the desired value. The default is 256.

This example displays 04 Modulo set to 200.

```

>4, 200
Menu 4.2.11.12.11
01*BX25 Support (Enabled, Disabled)-----Disabled
02*Use these configuration values (Enabled, Disabled)----- Enabled
03 Sending Unit Number (0 - 9)-----0
04 Modulo (5 - 256)-----200

```



Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select BX. 25 Menu. The BX.25 Menu appears.
3. For BX. 25 Modul o, enter the desired value. The default is 256.

This example displays BX. 25 Modul o set to 150.

```

BX. 25 Menu
Link being configured . . . . . 03
BX. 25 Support . . . . . Enabled [Di sabl ed]
Use BX. 25 Configurati on Val ues. . . . . [Enabl ed] Di sabl ed
Sendi ng Uni t Number . . . . . 4
BX. 25 Modul o. . . . . 150
    
```

BX.25 Support

Description

This menu item enables or disables BX.25 module support on a link. BX.25 support can only be enabled on one link at a time. When enabling BX.25 support, first disable support on all other links.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 01*BX25 Support, enter 1 to select Enabled or Di sabl ed. The default is Di sabl ed.

This example displays 01*BX25 Support set to Enabled.

```

>1
01*BX25 Support (Enabl ed, Di sabl ed)----- Menu 4. 2. 11. 12. 11 Enabl ed
    
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select BX.25 Menu. The BX.25 Menu appears.
3. For BX.25 Support, select Enabled or Disabled. The default is Disabled.

This example displays BX.25 Support set to Enabled.

```

                                     BX.25 Menu
Link being configured . . . . . 03
BX.25 Support . . . . . [Enabled] Disabled

```

BX.25 Timer Settings

Description

The initial BX.25 timer settings are configured using two menu items:

- Connect timer ST2—Defines the maximum number of seconds that the BX.25 protocol will wait for a response to a session connect request.
- Send timer ST3—Defines the data acknowledge timer, which gives the maximum number of seconds that the BX.25 protocol will wait for an acknowledgement to a Data Request.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 05 Connect Timer ST2, enter 5, and the connect timer value. Valid values are 0 to 65535. The default is 12.
3. For 06 Send Timer ST3, enter 6, and the send timer value. Valid values are 0 to 65535. The default is 18.

This example displays 05 Connect Timer ST2 set to 33 and 06 Send Timer ST3 set to 45.

```

>6, 35
Menu 4.2.11.12.11
01*BX25 Support (Enabled, Disabled)----- Enabled
02*Use these configuration values (Enabled, Disabled)----- Enabled
03 Sending Unit Number (0 - 9)-----2
04 Modul o (5 - 256)-----122
05 Connect Timer ST2 (seconds)-----00033
06 Send Timer ST3 (seconds)-----00045
    
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. From the X.25 Link Menu, select the BX.25 Menu.
3. For Connect Timer ST2, enter the connect timer value. The default is 12.
4. For Send Timer ST3, enter the send timer value. The default is 18.

This example displays Connect Timer ST2 set to 225 and Send Timer ST3 set to 275.

```

BX.25 Menu

Link being configured . . . . . 03
BX.25 Support . . . . . [Enabled] Disabled
Use BX.25 Configuration Values. . . . . [Enabled] Disabled
Sending Unit Number . . . . . 5
BX.25 Modul o. . . . . 200
Connect Timer ST2 (seconds) . . . . . 225
Send Timer ST3 (seconds). . . . . 275
    
```

Connect Options Configuration

Connect options configure the AI296 connection parameters. These options are available for asynchronous links and asynchronous PPP links. The following configuration items are available:

- [Alias](#)
- [Call Retry Interval](#)
- [Connect String](#)
- [Connection Settings](#)
- [Link Application](#)

Alias

Description

This menu item specifies an alias name for the connection. When the link connection options are satisfied, a call is placed based on information contained in the alias name.

The specified name must correspond to an alias that has been created in the Alias Menu. If no alias name is specified and `Link Application` is set to `ALIAS` in the AI198 menu system (`AppAlias` in the AI296 local menu system), then a default alias is used. The default alias is the concatenation of the string `asy.` with the numeric link number, such as `asy. 3`, which indicates link number 3.



Note: The `02 Alias` menu item is used only if `01*Link Application` is set to `ALIAS` (`AppAlias` in the AI296 local menu system).

Menu Item Type

Data

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For `02 Alias`, enter `2`, and the alias name.

This example displays 02 Alias set to async. 4. 1.

```

>2, async. 4. 1
Menu 4. 2. 11. 12. 11
01*Link Application (Login, Destination, Alias)-----ALIAS
02 Alias-----async. 4. 1
    
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Connect Options Menu. The Connect Options Menu appears.
3. For Link Application Alias, enter the alias value.

This example displays Link Application Alias set to async. 4. 1.

```

Connect Options Menu

Link being configured . . . . . 1
Link Application . . . . . Login Destination [AppAlias]
Link Application Alias . . . . . async. 4. 1
    
```

Call Retry Interval

Description

This menu item defines a value for the call retry interval. If a call fails to connect and the retry interval is greater than 0, the link attempts to place the call again after the specified number of seconds elapse. This setting has no effect on calls placed to the link when the link is the destination and not the call originator. A value of 0 disables call retry interval functionality.

Menu Item Type

Data

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 03 Call retry interval, enter 3, and the interval value. The default is 0.

This example displays 03 Call retry interval set to 134.

```

>3, 134
Menu 4.2.11.12.11
01*Link Application (Login, Destination, Alias)-----ALIAS
02 Alias-----async. 4.1
03 Call retry interval (0 - 32767 s, 0 = disabled)-----00134
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Connect Options Menu. The Connect Options Menu appears.
3. For Call Retry Interval, enter the desired interval value. The default is 0.

This example displays Call Retry Interval set to 134.

```

Connect Options Menu

Link being configured . . . . . 1
Link Application . . . . . Login Destination [AppAlias]
Link Application Alias . . . . . async. 4.1
Call Retry Interval (0 - 32767s, 0 = disable) . . . . . 134
  
```

Connect String

Description

This menu item configures the string that is sent after a connection is established. The following character values apply:

- sends a break signal.
- <n> represents the decimal value of an ASCII character. Valid values are 0 to 255.
- *text* represents the text value in the string.
- <p #> represents a pause control sequence. # is the number of tenths of seconds to pause. Valid values are 1 to 20 (for 0.1 seconds to 2 seconds).

For example, string login<13><p 10> sends:

- A break signal
- Text "login"
- A carriage return
- A 1 second pause
- Another break signal.

Menu Item Type

Data

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 08 Connect string, enter 8, and the connect string.

This example displays 08 Connect string set to newstring<33><p 13>.

```
>8, <b>newstring<33><p 13><b>
Menu 4.2.11.12.11
01*Link Application (Login, Destination, Alias)-----ALIAS
02 Alias-----async. 4.1
03 Call retry interval (0 - 32767 s, 0 = disabled)-----00134
04 Dial/Connect when DSR is on-----N/A
05*Connect when DCD is on-----OFF
06*Connect when characters are received-----ON
07*Connect without DSR, DCD or received characters-----OFF
08 Connect string-----<b>newstring<33><p 13><b>
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Connect Options Menu. The Connect Options Menu appears.
3. For Connect String, enter the connect string.

This example displays Connect String set to newstring<33><p 13>.

```
Connect Options Menu

Link being configured . . . . . 1

Link Application . . . . . Login Destination [AppAlias]
Link Application Alias . . . . . async. 4.1
Call Retry Interval (0 - 32767s, 0 = disable) . . . . . 134
Dial/Connect when DSR is on . . . . . On [Off]
Connect when DCD is on . . . . . [On] Off
Connect when characters are received. . . . . On [Off]
Connect without DSR, DCD or received characters . . . . . On [Off]
Connect String . . . . . <b>newstring<33><p 13><b>
```

Connection Settings

Description

The connection settings are configured using three menu items:

- **Connect when DCD is on**—Enables or disables link connection when DCD is asserted. If **Connect when characters are received** is also enabled and is satisfied first, then **Connect when DCD is on** has no effect on the link connection.
- **Connect when characters are received**—Enables or disables the link connection when incoming characters are received. If **Connect when DCD is on** is also enabled and is satisfied first, then **Connect when characters are received** has no effect on the link connection.
- **Connect without DSR, DCD or received characters**—When this menu item is enabled, **Connect when DCD is on** and **Connect when characters are received** are forced off and the retry interval is set to 30. If the link application type is set to **LOGIN OR ALIAS**, connection will occur as soon as the link is enabled (completely independent from the DCD and incoming character status). If the link application type is set to **DESTINATION**, the link will connect immediately when an outgoing call is placed to the destination (also completely independent from DCD and incoming character status).



Note: Dial /Connect when DSR is on has no effect on AI296 operation.

Menu Item Type

Toggle

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 05*Connect when DCD is on, enter **5** to select ON or OFF. The default is OFF.
3. For 06*Connect when characters are received, enter **6** to select ON or OFF. The default is ON.
4. For 07*Connect without DSR, DCD or received characters, enter **7** to select ON or OFF. The default is OFF.

This example displays:

- 05*Connect when DCD is on **set to ON**
- 06*Connect when characters are received **set to OFF**
- 07*Connect without DSR, DCD or received characters **set to OFF**.

```

>5
Menu 4.2.11.12.11
01*Link Application (Login, Destination, Alias)-----ALI AS
02 Alias-----async. 4.1
03 Call retry interval (0 - 32767 s, 0 = disabled)-----00030
04 Dial/Connect when DSR is on-----N/A
05*Connect when DCD is on----- ON
06*Connect when characters are received-----OFF
07*Connect without DSR, DCD or received characters-----OFF
    
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Connect Options Menu. The Connect Options Menu appears.
3. For Connect when DCD is on, select ON or OFF. The default is OFF.
4. For Connect when characters are received, select ON or OFF. The default is ON.
5. For Connect without DSR, DCD or received characters, select ON or OFF. The default is OFF.

This example displays:

- Connect when DCD is on **set to On**
- Connect when characters are received **set to Off**
- Connect without DSR, DCD or received characters **set to Off**.

```

Connect Options Menu

Link being configured . . . . . 1

Link Application . . . . . Login Destination [AppAlias]
Link Application Alias . . . . . async. 4.1
Call Retry Interval (0 - 32767s, 0 = disable) . . . . . 134
Dial/Connect when DSR is on . . . . . On [Off]
Connect when DCD is on. . . . . [On] Off
Connect when characters are received. . . . . On [Off]
Connect without DSR, DCD or received characters . . . . . On [Off]
    
```

Link Application

Description

This menu item configures the link application type. The following options are available:

- **Logi n**—Specifies that the link will prompt for a user name and password when connected. Upon successful login, a menu appears showing the available destination alias names.
- **Desti nati on**—Specifies that the link does not accept incoming calls. The link must be accessed internally using alias lookup from another link or from a TCP/IP connection.
- **Al i as (AppAl i as)**—Specifies that the link will attempt to place a call using direct alias lookup without displaying a destination menu. If the link has a link application alias name configured, then that name is used. Otherwise, a default alias name (*ASY. I i nkNum*) is used.

Menu Item Type

Toggle

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.11.
2. For 01*Li nk Appl i cati on, enter 1 to select LOGI N, DESTI NATI ON, OR ALI AS. The default is LOGI N.

This example displays 01*Li nk Appl i cati on set to DESTI NATI ON.

```
>1
01*LI nk Appl i cati on (Logi n, Desti nati on, Al i as)-----DESTI NATI ON
Menu 4. 2. 11. 12. 11
```



Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Connect Options Menu. The Connect Options Menu appears.
3. For Link Application, select Login, Destination, or AppAlias. The default is Login.

This example displays Link Application set to Destination.

Connect Options Menu			
Link being configured			1
Link Application	Login	[Destination]	AppAlias

Disconnect Options Configuration

Disconnect options configure the parameters that are used when AI296 disconnects. These options are available for asynchronous and asynchronous PPP links. The following configuration items are available:

- [Disconnect Inactivity Timer Settings](#)
- [Disconnect Settings](#)
- [Disconnect String](#)

Disconnect Inactivity Timer Settings

Description

The disconnect inactivity timer settings are configured using three menu items:

- `Disconnect inactivity timer`—Defines an inactivity timer value. This value establishes a timeout interval after which the link will automatically disconnect if no data has been sent or received for the specified number of seconds. This value only applies to incoming calls on links that have a retry interval timer setting of 0 and a link application setting of `LOGIN` or `ALIAS` (`AppAlias`).



Note: The `Disconnect inactivity timer` option must be set to a value greater than 0 for the inactivity timer to function.

- `Inactivity timer enabled when link receives call`—Enables or disables the disconnect inactivity timer when the link receives a call.
- `Inactivity timer resets on incoming characters from destination`—When enabled, incoming characters count as activity on a link (the inactivity timer resets). When disabled, they do not count (the inactivity timer does not reset).

Menu Item Type

Data for disconnect inactivity timer

Toggle for Inactivity timer enabled when link receives call and Inactivity timer resets on incoming characters from destination

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.12.
2. For 04 `Disconnect inactivity timer`, enter 4, and the timer value. The default is 0.

3. For 05*Inactivity Timer enabled when link receives call, enter 5 to select ON or OFF. The default is OFF.
4. For 06*Inactivity Timer resets on incoming characters from destination, enter 6 to select ON or OFF. The default is ON.

This example displays:

- 04 Disconnect inactivity timer set to 236
- 05*Inactivity Timer enabled when link receives call set to ON
- 06*Inactivity Timer resets on incoming characters from destination set to OFF.

```

>12
Menu 4.2.11.12.12
01 Disconnect when DSR off-----N/A
02*Disconnect when DCD off-----OFF
03*Disconnect when a break character is received----- ON
04 Disconnect inactivity timer (0 - 32767 s, 0 = disabled)-----00236
05*Inactivity Timer enabled when link receives call----- ON
06*Inactivity Timer resets on incoming characters from destination-----OFF
    
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Disconnect Options Menu. The Disconnect Options Menu appears.
3. For Disconnect inactivity timer, enter the timer value. The default is 0.
4. For Inactivity Timer enabled when link receives call, select On or Off. The default is off.
5. For Inactivity Timer resets on incoming characters from destination, select On or off. The default is On.

This example displays:

- Disconnect inactivity timer set to 367.
- Inactivity Timer enabled when link receives call set to On.
- Inactivity Timer resets on incoming characters from destination set to Off.

```

                          Disconnect Options Menu

Link being configured . . . . . 3

Disconnect when DCD is off . . . . . On [Off]
Disconnect when a Break character is received . . . . . [On] Off
Disconnect inactivity timer (0 - 32767s, 0 = disabled) . . . . . 367
Inactivity Timer enabled when link receives call . . . . . [On] Off
Inactivity Timer resets on incoming characters from destination . . . . . On [Off]
    
```

Disconnect Settings

Description

The disconnect settings are configured using two menu items:

- Disconnect when a break character is received—Enables or disables link disconnection when a break character is received.
- Disconnect when DCD off—Enables or disables link disconnection when DCD is not asserted.



Note: AI296 does not consider the DSR state when disconnecting calls.

Menu Item Type

Toggle

Link Type Availability

Both menu items are available for async links

Menu item Disconnect when DCD off is available for asyncPPP links

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.12.
2. For 02*Disconnect when DCD off, enter 2 to select ON or OFF. The default is OFF.
3. For 03*Disconnect when a break character is received, enter 3 to select ON or OFF. The default is ON.

This example displays 02*Disconnect when DCD off set to ON and 03*Disconnect when a break character is received set to OFF.

```
>3
Menu 4.2.11.12.12
01 Disconnect when DSR off-----N/A
02*Disconnect when DCD off-----ON
03*Disconnect when a break character is received-----OFF
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Disconnect Options Menu. The Disconnect Options Menu appears.
3. For Disconnect when DCD is off, select On or Off. The default is Off.
4. For Disconnect when a Break character is received, select On or Off. The default is On.

This example displays Disconnect when DCD is off set to On and Disconnect when a Break character is received set to Off for an async link.

Disconnect Options Menu		
Link being configured		4
Disconnect when DCD is off	[On]	Off
Disconnect when a Break character is received	On	[Off]

Disconnect String

Description

This menu item configures the string the link sends before the link disconnects. The following character values apply:

- `` sends a break signal.
- `<n>` represents the decimal value of an ASCII character. Valid values are 0 to 255.
- `text` represents the text value in the string.
- `<p #>` represents a pause control sequence. # is the number of tenths of seconds to pause. Valid values are 1 to 20 (for 0.1 seconds to 2 seconds).

For example, string `login<13><p 10>` sends:

- A break signal
- The text "login"
- A carriage return
- A one second pause
- Another break signal.

Menu Item Type

Data

Link Type Availability

Async

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.12.
2. For 07 Disconnect string, enter 7, and the disconnect string. Maximum length is 80 characters.

This example displays 07 Disconnect string set to newString<33><p 15>.

```

>7, <b>newString<33><p 15><b>
Menu 4.2.11.12.12
01 Disconnect when DSR off-----N/A
02*Disconnect when DCD off----- 0N
03*Disconnect when a break character is received-----OFF
04 Disconnect inactivity timer (0 - 32767 s, 0 = disabled)-----00000
05*Inactivity Timer enabled when link receives call-----OFF
06*Inactivity Timer resets on incoming characters from destination----- 0N
07 Disconnect string-----<b>newString<33><p 15><b>
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu.
2. Select Disconnect Options Menu. The Disconnect Options Menu appears.
3. For Disconnect String, enter the disconnect string.

This example displays Disconnect String set to newString<33><p 15>.

```

Disconnect Options Menu

Link being configured . . . . . 3
Disconnect when DCD is off . . . . . [On] Off
Disconnect when a Break character is received . . . . . On [Off]
Disconnect inactivity timer (0 - 32767s, 0 = disabled) . . . . . 367
Inactivity Timer enabled when link receives call . . . . . [On] Off
Inactivity Timer resets on incoming characters from destination . . . . . On [Off]
Disconnect String . . . . . <b>newString<33><p 15><b>
  
```

General Link Properties Configuration

General link properties are configurable using menus accessed directly from the link configuration menu. The following configuration items are available:

- [Auto Disable Error Limit](#)
- [Flow Control](#)
- [Hardware Interface \(Interface Type\)](#)
- [Interface Mode](#)
- [Link Description](#)
- [Link Mode](#)
- [Link Number](#)
- [Link State](#)
- [Link Type](#)
- [Passive Link with Clocking](#)
- [Port Data Bits](#)
- [Port Parity](#)
- [Port Speed](#)
- [Port Stop Bits](#)
- [Sync Port Encoding](#)
- [Xon Repeat Interval](#)

Auto Disable Error Limit

Description

This menu item disables a link when the rate of errors received on that link exceeds a user-specified threshold. This prevents a bad link or cable from streaming enough errors to lock up or crash AI296.

Menu Item Type

Data

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For `Auto Disable Error Limit`, enter the associated item number, a comma, and the error limit value. (For example, `9, 25000`.) The default is `0`.

This MLT link example displays 09 Auto Disable Error Limit set to 25000.

```
>9, 25000
Menu 4.2.11.12
01 Link number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- MLT
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05 Port speed (0 - 128000 bps, 0 is external clocking)-----009600
06*Hardware Interface (RS232, RS530, V. 35)-----RS232
07*Sync Port Encoding (NRZ, NRZI)-----NRZ
08+LAPB Parameters
09 Auto Disable Error Limit (0-100000)-----0025000
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. Select Auto Disable Menu. The Link Auto Disable Menu appears.
3. For Errors/second limit for auto disable, enter the error limit value. The default is 0.

This example displays Errors/second limit for auto-disable set to 25000.

```
Link Auto Disable Menu

Link being configured . . . . . 03
Errors/second limit for auto-disable . . . . . 25000
```

Flow Control

Description

This menu item enables a receiving device to tell a sending device to stop sending data when data is coming too fast and to start sending data when the receiver is ready.

There are two available flow control options for AI296:

- None—Specifies no flow control.
- XonXoff—Specifies the flow control option that uses standard ASCII control characters to tell a sending device to stop or resume data transmission.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 09*Flow Control, enter 9 to select None or XonXoff. The default is None.

This async link example displays 09*Flow Control set to XonXoff.

```

>9
                                                                 Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----8
07*Port Stop Bits (1, 2)-----1
08*Port Parity (None, Odd, Even)-----None
09*Flow Control (None, XonXoff)-----XonXoff
    
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For SW Flow Control, select None or XonXoff.

This example displays SW Flow Control set to XonXoff.

```

                                     Async Link Menu
Link to configure . . . . . 1
Link Description . . . . . Async link 1
Link state . . . . . [Enabled] Disabled
Link Type . . . . . [Async] AsyncPPP ModMux
Port speed (in bits per second):
  300 1200 2400 4800 [9600] 19.2K 38.4K 57.6K 115.2K
  Autobaud
Port data bits . . . . . Seven [Eight]
Port stop bits . . . . . [One] Two
Port parity . . . . . [None] Even Odd
SW Flow Control . . . . . None [XonXoff]
    
```

Hardware Interface (Interface Type)

Description

This menu item configures the hardware connection used for an AI296 link. The following hardware connections are available:

- RS232—A data transmission standard that defines the characteristics for connecting DTE and DCE data communications devices.
- RS530—A data transmission standard that is similar to RS232, but with support for higher data rates (ranging from 20 Kbps to 2 Mbps).

- v. 35—Data transmission standard for a trunk interface between a network access device and a packet network.

Menu Item Type

Toggle

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For Hardware Interface, enter the associated item number to select RS232, RS530, or v. 35. The default is RS232.

This asynchronous link example displays 15*Hardware Interface set to V. 35.

```

>15
Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async Link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----8
07*Port Stop Bits (1, 2)-----1
08*Port Parity (None, Odd, Even)-----None
09*Flow Control (None, XonXoff)----- None
10 Xon Repeat interval (0 - 120s with 0 = no repeat)-----000
11+Connect Options
12+Disconnect Options
13+RTS/DTR Lead Control Options
14+Modem Options
15*Hardware Interface (RS232, RS530, V. 35)-----V. 35
  
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For Interface Type, select RS-232, RS-530, Or V. 35.

This example displays Interface Type set to V. 35.

```

Async Link Menu
Link to configure . . . . . 2
Link state . . . . . Up [Down]
Link Type . . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . RS-232 RS-530 [V. 35]
  
```




Interface Mode

Description

This menu item configures the interface mode as either DTE or DCE. DTE is used for a communications device (typically a terminal or computer) that is the source or destination of signals on a network. DCE is used for a device (typically the modem) that establishes, maintains, and terminates a session on a network. It may also convert signals for transmission.

Menu Item Type

Toggle

Link Type Availability

MLT and X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.8 for MLT or menu 4.2.11.12.7 for X.25.
2. For 01*Interface mode, enter 1 to select DCE or DTE. The default is DCE.

This example displays 01*Interface mode set to DTE for an MLT link.

```
>1
01*Interface mode (DTE or DCE)-----DTE
Menu 4. 2. 11. 12. 8
```

Configuration in the AI296 Local Menu System

For MLT links:

1. Access the MLT Link Menu.
2. For Interface Mode, select DCE or DTE. The default is DCE.

This example displays Interface Mode set to DTE.

```
MLT Link Menu
Link to configure . . . . . 1
Link state . . . . . [Up] Down
Link Type . . . Async X.25 HDLC-Bridge SyncPPP AsyncPPP [MLT]
Interface Type . . . . . [RS-232] RS-530 V.35
Link Description . . . . . Async Link 1
Interface Mode . . . . . [DTE] DCE
```

For X.25 links:

1. Access the X.25 Link Menu.
2. From the X.25 Link Menu, select `Quick X.25 Menu`. The Quick X.25 Menu appears.
3. For `Interface Mode`, select `DCE` or `DTE`. The default is `DCE`.

This example displays `Interface Mode` set to `DTE`.

```

                                Quick X.25 Menu

Link being configured . . . . . 01
Interface Mode . . . . . [DTE] DCE
  
```

Link Description

Description

This menu item defines a description for a link.

Menu Item Type

Data

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For `03 Link Description`, enter `3`, and a description associated with the link. Maximum length is 30 characters.

This example displays `03 Link Description` set to `New X.25 Link`.

```

>3, New X.25 Link
                                Menu 4.2.11.12
01 Link number (1-16)-----03
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- X.25
03 Link Description----- New X.25 Link
  
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For `Link Description`, enter a description associated with the link. Maximum length is 30 characters.

This example displays Link Description set to New X.25 Link.

```

X.25 Link Menu

Link to configure . . . . . 3
Link state . . . . . [Up] Down
Link Type . . . Async [X.25] HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . RS-232 [RS-530] V.35
Link Description . . . . . New X.25 Link
  
```

Link Mode

Description

This menu item defines the mode of operation for an X.25 link as normal, passive, or extended:

- Normal mode is used for normal X.25 service.
- Passive mode allows AI296 to operate with the SCCS application of the AT&T 5ESS. The SCCS application requires redundant links at the 5ESS. These links are called SCC0B and SCC1B. Only one link is active at a time. The 5ESS constantly tries to bring up whichever link is idle. If the 5ESS has SCC0B active, it will try to bring up SCC1B. If SCC1B comes up, the 5ESS will drop SCC0B and send information on SCC1B. Passive mode ensures that either SCC0B or SCC1B will be up, but not simultaneously.
- Extended mode supports passive link capability to the 5ESS over a TCP/IP network. Extended mode ensures that either SCC0A or SCC1A will be up but not simultaneously and will temporarily take down the corresponding link if connections fail or cannot be placed because the corresponding remote link is down.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.1114.12.
2. For 05*Link mode, enter 5 to select Normal, Passive, or Extended. The default is Normal.

This example displays 05*Link mode set to Passive.

```

>5
01 Link number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- X.25
03 Link Description----- Async Link 1
04*Link state (Enabled, Disabled)----- Enabled
05*Link mode (Normal, Passive, Extended)----- Passive
  
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. From the X.25 Link Menu, select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For X25 Passive Link Mode, select Normal, Passive, or Extended. The default is normal.

This example displays X25 Passive Link Mode set to Passive.

```

                Quick X.25 Menu

Link being configured . . . . . 03
Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 4800
X25 Passive Link Mode . . . . . Normal [Passive] Extended
  
```

Link Number

Description

This menu item defines the number of the link being configured.

Menu Item Type

Data

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 01 Link number, enter 1, and the link number. The default is 1.



This example displays 01 Link number set to 3.

```
>1,3
01 Link number (1-16)-----03
Menu 4.2.11.12
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For Link to configure, enter the link number. The default is 1.

This example displays Link to configure set to 3.

```
Async Link Menu
Link to configure . . . . . 3
```

Link State

Description

This menu item enables or disables a link.

Menu Item Type

Toggle

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 04*Link state, enter 4 to select Enabled or Disabled. The default is Enabled.

This example displays 04*Link state set to Disabled.

```
>4
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)-----Disabled
Menu 4.2.11.12
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For Link state, select Up or Down. The default is Down.

This example displays Link state set to Down.

```

X.25 Link Menu

Link to configure . . . . . 3
Link state . . . . . Up [Down]
  
```

Link Type

Description

This menu item defines the type of link as asynchronous, X.25, HDLC, synchronous PPP, asynchronous PPP, or MLT. Refer to section [AI296 Link Types on page 6-2](#) for more information about link types.

Menu Item Type

Toggle

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 02*Link Type, enter 2 to select Async, X25, HDLC, SyncPPP, AsyncPPP, or MLT. The default is Async.

This example displays 02*Link Type set to HDLC.

```

>2
Menu 4.2.11.12
01 Link number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- HDLC
  
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For Link Type, select Async, X25, HDLC, SyncPPP, AsyncPPP, or MLT. The default is Async.

This example displays Link Type set to HDLC-Bridge.

```

HDLC-Bridge Link Menu

Link to configure . . . . . 1
Link state . . . . . [Up] Down
Link Type . . Async X.25 [HDLC-Bridge] SyncPPP AsyncPPP MLT
  
```



Passive Link with Clocking

Description

This menu item enables or disables an X.25 passive link from supplying a clock value while the link is in the inactive state.



Note: Old AT&T 5ESS interface cards (TN983) require clocking with the passive link set up.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 13*Passive Link with Clocking, enter 13 to select Enabled or Disabled. The default is Disabled.

This example displays 13*Passive Link with Clocking set to Enabled.

```
>13
Menu 4.2.11.12
01 Link number (1-16)-----05
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- X.25
03 Link Description----- X.25 Link 5
04*Link state (Enabled, Disabled)-----Disabled
05*Link mode (Normal, Passive, Extended)----- Normal
06 Port speed (0 - 128000 bps, 0 is external clocking)-----009600
07+X25 LAPB Parameters
08+X25 Parameters
09+Virtual Circuits
10*Hardware Interface (RS232, RS530, V.35)-----RS232
11+BX25 Configuration
12 Auto Disable Error Limit (0-1000000)-----0000000
13*Passive Link with Clocking (Enabled, Disabled)----- Enabled
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. From the X.25 Link Menu, select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For Passive Link with Clocking, select Enabled or Disabled. The default is Disabled.

This example displays **Passive Link with Clocking set to Enabled**.

```

                                Quick X.25 Menu

Link being configured . . . . . 05

Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 9600
X25 Passive Link Mode . . . . . [Normal] Passive Extended
Passive Link with Clocking . . . . . [Enabled] Disabled
  
```

Port Data Bits

Description

This menu item defines the number of databits in a data byte.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 06*Port Data Bits, enter 6 to select 7 or 8. The default is 8.

This example displays 06*Port Data Bits set to 7.

```

>6
                                Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----7
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. For Port data bits, select Seven or Eight. The default is Eight.

This example displays Port data bits set to Seven.

```

                                Async Link Menu

Link to configure . . . . . 5
Link state . . . . . Up [Down]
Link Type . . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . [RS-232] RS-530 V.35
Port speed (in bits per second):
  300 1200 2400 4800 [9600] 19.2K 38.4K 57.6K 115.2K
  Autobaud
Port data bits . . . . . [Seven] Eight
  
```

Port Parity

Description

This menu item defines parity, which is a process for detecting whether or not bits of data have been altered during data transmission.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 08*Port Parity, enter 8 to select None, Odd, or Even. The default is None.

This example displays 08*Port Parity set to Odd.

```

>8
                                Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----8
07*Port Stop Bits (1, 2)-----1
08*Port Parity (None, Odd, Even)----- Odd
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. For Port parity, select None, Even, or Odd. The default is None.

This example displays Port parity set to Odd.

```

                                Async Link Menu

Link to configure . . . . . 5
Link state . . . . . Up [Down]
Link Type . . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . [RS-232] RS-530 V.35
Port speed (in bits per second):
  300 1200 2400 4800 [9600] 19.2K 38.4K 57.6K 115.2K
  Autobaud
Port data bits . . . . . [Seven] Eight
Port stop bits . . . . . One [Two]
Port parity . . . . . None Even [Odd]
  
```

Port Speed

Description

This menu item defines the baud rate for a port.


Menu Item Type

Data in the AI296 local menu system

Link Type Availability

Async, AsyncPPP, HDLC-Bridge, MLT, SyncPPP, and X.25

Configuration in the AI198 Menu System

 **Note:** The menu configuration has two variations based on the type of link being configured.


To configure the port speed on Async or AsyncPPP links:

1. Access Menu 4.2.11.12.
2. For Port speed, enter the associated item number.

Menu 4.2.11.12.5 appears.

```

>5
                                                    Menu 4. 2. 11. 12. 5
01 300   Baud
02 1200  Baud
03 2400  Baud
04 4800  Baud
05 9600  Baud
06 19200 Baud
07 38400 Baud
08 57600 Baud
09 115200 Baud
10 Auto  Baud
    
```

 **Note:** 10 Auto Baud is not available for AsyncPPP.

3. Enter a value from 1 to 10 to select the port speed. Menu 4.2.11.12 reappears with the new port speed selection.

This example displays 05+Port speed set to 4800.

```

>4
                                                    Menu 4. 2. 11. 12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async Link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 4800
    
```

To configure the port speed on an HDLC-Bridge, MLT, SyncPPP, or X.25 link:

1. Access Menu 4.2.11.12.
2. For Port speed, enter the associated item number, a comma, and the port speed value.

This example displays 06 Port speed set to 19200.

```

>6,19200
                                                    Menu 4. 2. 11. 12
01 Link number (1-16)-----13
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- HDLC
03 Link Description-----
04*Link state (Enabled, Disabled)-----Disabled
06 Port speed (0 - 128000 bps, 0 is external clocking)-----019200
    
```

Configuration in the AI296 Local Menu System

1. Access the Link Menu.
2. For Port speed, select 300, 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K, or Autobaud. The default is 9600.

This example displays Port speed set to 4800.

```

                                Async Link Menu
Link to configure . . . . . 3
Link state . . . . . Up [Down]
Link Type . . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . [RS-232] RS-530 V.35
Port speed (In bits per second):
    300 1200 2400 [4800] 9600 19.2K 38.4K 57.6K 115.2K
    Autobaud
  
```

Port Stop Bits

Description

This menu item defines the number of stop bits. A stop bit is an extra bit at the end of an asynchronous character that helps the receiver recognize the end of the character.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 07*Port Stop Bits, enter 7 to select 1 or 2. The default is 1.

This example displays 07*Port Stop Bits set to 2.

```

>7
                                Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----8
07*Port Stop Bits (1, 2)-----2
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. For Port stop bits, select One or Two. The default is One.

This example displays Port stop bits set to Two.

```

                                Async Link Menu
Link to configure . . . . . 5
Link state . . . . . Up [Down]
Link Type . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . [RS-232] RS-530 V.35
Port speed (in bits per second):
    300 1200 2400 4800 [9600] 19.2K 38.4K 57.6K 115.2K
Autobaud
Port data bits . . . . . [Seven] Eight
Port stop bits . . . . . One [Two]
    
```

Sync Port Encoding

Description

This menu item sets the binary encoding on a port.

Menu Item Type

Toggle

Link Type Availability

MLT

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 07*Sync Port Encoding, enter 7 to select NRZ or NRZI. The default is NRZ.

This example displays 07*Sync Port Encoding set to NRZI.

```

>7
                                Menu 4.2.11.12
01 Link number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- MLT
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05 Port speed (0 - 128000 bps, 0 is external clocking)-----009600
06*Hardware Interface (RS232, RS530, V.35)-----RS232
07*Sync Port Encoding (NRZ, NRZI)-----NRZI
    
```

Configuration in the AI296 Local Menu System

1. Access the MLT Link Menu.
2. For Sync Port Encoding, select NRZ or NRZI. The default is NRZ.

This example displays Sync Port Encoding set to NRZI.

```
MLT Link Menu

Link to configure . . . . . 5
Link state . . . . . Up [Down]
Link Type . . . Async X.25 HDLC-Bridge SyncPPP AsyncPPP [MLT]
Interface Type . . . . . [RS-232] RS-530 V.35
Link Description . . . . . X.25 Link 5

Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 9600
Sync Port Encoding . . . . . NRZ [NRZI]
```

Xon Repeat Interval

Description

This menu item enables or disables the XON repeat interval. When enabled, AI296 sends multiple XON characters at the specified interval. Some equipment requires the receipt of multiple XONs before sending data after it has received an XOFF.

Menu Item Type

Data

Link Type Availability

Aysnc and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.
2. For 10 Xon Repeat interval, enter 10, and a interval value. The default is 0.

This example displays 10 Xon Repeat interval set to 30.

```

>10, 30
Menu 4.2.11.12
01 Link Number (1-16)-----01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)----- Async
03 Link Description----- Async link 1
04*Link state (Enabled, Disabled)----- Enabled
05+Port speed----- 9600
06*Port Data Bits (7, 8)-----8
07*Port Stop Bits (1, 2)-----1
08*Port Parity (None, Odd, Even)-----None
09*Flow Control (None, XonXoff)----- None
10 Xon Repeat interval (0 - 120s with 0 = no repeat)-----030
    
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. For XON Repeat Interval, enter a interval value. The default is 0.

This example displays XON Repeat Interval set to 30.

```

                          Async Link Menu

Link to configure . . . . . 3
Link state . . . . . Up [Down]
Link Type . . . [Async] X.25 HDLC-Bridge SyncPPP AsyncPPP MLT
Interface Type . . . . . [RS-232] RS-530 V.35
Port speed (in bits per second):
  300 1200 2400 [4800] 9600 19.2K 38.4K 57.6K 115.2K
Autobaud
Port data bits . . . . . Seven [Eight]
Port stop bits . . . . . One [Two]
Port parity . . . . . None Even [Odd]
SW Flow Control . . . . . [None] XonXoff
XON Repeat Interval (0 - 120s with 0 = no repeat) . . . . . 30
    
```

General PPP Properties Configuration

The following menu items are available for PPP configuration:

- [IPCP Address Settings](#)
- [Maximum Unit Settings](#)
- [Network Control Protocol](#)

IPCP Address Settings

Description

The IPCP address settings are configured using three menu items:

- Local IP address—Defines a valid local IP address for AI296.
- Remote IP address—Defines an IP address for the remote device.
- Subnet mask—Defines a subnet mask for the link.

Menu Item Type

Data

Link Type Availability

AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.2.
 - For a synchronous PPP link, access Menu 4.2.11.12.8.
2. For 01*Network Control Protocol, enter 1 to select IPCP. The default is IPCP.
3. For 02 Local IP Address, enter 2, and the IP address. Entering 0.0.0.0 specifies that the remote device will assign the IP address for AI296. The default is 0.0.0.0.
4. For 03 Remote IP Address, enter 3, and the IP address. Entering 0.0.0.0 specifies that the remote device will assign its own IP address. The default is 0.0.0.0.
5. For 04 Subnet Mask, enter 4, and the subnet mask. The default is 255.255.255.240.

This example displays:

- 01*Network Control Protocol **set to** IPCP
- 02 Local IP Address **set to** 099.045.006.033
- 03 Remote IP Address **set to** 106.046.092.004
- 04 Subnet Mask **set to** 255.255.255.000.

```

>4, 255.255.255.000
                                                    Menu 4. 2. 11. 12. 8
01*Network Control Protocol (IPCP, BCP)-----|PCP
02 Local IP Address-----099.045.006.033
03 Remote IP Address-----106.046.092.004
04 Subnet Mask-----255.255.255.000
    
```

Configuration in the AI296 Local Menu System

1. Access the AsyncPPP or SyncPPP Link Menu.
2. Select PPP Configuration Menu. The PPP Configuration Menu appears.
3. For Local IP address, enter the IP address. Entering 0.0.0.0 specifies that the remote device will assign the IP address for AI296. The default is 0.0.0.0.
4. For Remote IP address, enter the IP address. Entering 0.0.0.0 specifies that the remote device will assign its own IP address. The default is 0.0.0.0.
5. For Subnet Mask, enter the subnet mask. The default is 255.255.255.240.

This example displays:

- Local IP address **set to** 23.230.34.5
- Remote IP address **set to** 23.230.34.6
- Subnet Mask **set to** 255.255.255.000.

```

                                PPP Configuration Menu

Link being configured . . . . . 3

Network Control Protocol . . . . . [IPCP] BCP


IPCP Address Parameters
Local IP address . . . . . 23.230.34.5
Remote IP address . . . . . 23.230.34.6
Subnet Mask . . . . . 255.255.255.000
    
```

Maximum Unit Settings

Description

The maximum unit settings are configured using two menu items:

- `Maximum receive unit (MRU)`—Defines the maximum number of bytes that can be received in a single packet.
- `Maximum transmit unit (MTU)`—Defines the maximum number of bytes that can be transmitted in a single packet.

 **Note:** During LCP negotiations on a PPP link, AI296 will advertise the MRU configured by the user. If the peer negotiates its MRU with AI296, then the MTU on the AI296 side will be set to the peer's MRU. If the peer does not negotiate its MRU, then the MTU on the AI296 side will be set to the value configured by the user.

Menu Item Type

Data

Link Type Availability

AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.2.
 - For a synchronous PPP link, access Menu 4.2.11.12.8.
2. For `05 Maximum Receive Unit`, enter **5**, and the byte value. The defaults are 1518 for network control protocol BCP and 1500 for network control protocol IPCP.
3. For `06 Maximum Transmit Unit`, enter **6**, and the byte value. The defaults are 1518 for network control protocol BCP and 1500 for network control protocol IPCP.

This example displays `05 Maximum Receive Unit` set to 1000 and `06 Maximum Transmit Unit` set to 900.

```
>6, 900
                                                    Menu 4. 2. 11. 12. 8
01*Network Control Protocol (IPCP, BCP)----- BCP
02 Local IP Address-----000. 000. 000. 000
03 Remote IP Address-----000. 000. 000. 000
04 Subnet Mask-----255. 255. 255. 240
05 Maximum Receive Unit (128-1568)-----1000
06 Maximum Transmit Unit (64-1600)-----0900
```



Configuration in the AI296 Local Menu System

1. Access the AsyncPPP or SyncPPP Link Menu.
2. Select PPP Configuration Menu. The PPP Configuration Menu appears.
3. For Maximum Receive Unit, enter the byte value. The defaults are 1518 for network control protocol BCP and 1500 for network control protocol IPCP.
4. For Maximum Transmit Unit, enter the byte value. The defaults are 1518 for network control protocol BCP and 1500 for network control protocol IPCP.

This example displays Maximum Receive Unit set to 1000 and Maximum Transmit Unit set to 900 for an IPCP network control protocol.

PPP Configuration Menu			
Link being configured			3
Network Control Protocol	[IPCP]	BCP	
IPCP Address Parameters			
Local IP address		0.0.0.0	
Remote IP address		0.0.0.0	
Subnet Mask		255.255.255.240	
Maximum Receive Unit			1000
Maximum Transmit Unit			900

Network Control Protocol

Description

This menu item defines the network control protocol as BCP or IPCP. BCP configures, enables, and disables bridge protocol modules on both ends of a PPP link. IPCP configures, enables, and disables IP protocol modules on both ends of a PPP link.

Menu Item Type

Toggle

Link Type Availability

AsyncPPP and SyncPPP



Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.2.
 - For a synchronous PPP link, access Menu 4.2.11.12.8.
2. For 01*Network Control Protocol, enter 1 to select IPCP or BCP. The default is IPCP.

This example displays 01*Network Control Protocol for a synchronous PPP link set to BCP.

```
>1
Menu 4.2.11.12.8
01*Network Control Protocol (IPCP, BCP)----- BCP
```

Configuration in the AI296 Local Menu System

1. Access the AsyncPPP Link Menu or SyncPPP Link Menu.
2. Select PPP Configuration Menu. The PPP Configuration Menu appears.
3. For Network Control Protocol, select IPCP or BCP. The default is IPCP.

This example displays Network Control Protocol set to IPCP.

```
PPP Configuration Menu

Link being configured . . . . . 3

Network Control Protocol . . . . . [IPCP] BCP
```

LAPB Parameters Configuration

The following settings are used to configure LAPB parameters for an MLT or X.25 link:

- [Frame Settings](#)
- [Interface Mode](#)
- [LAPB Timer Settings](#)
- [N2 Retry Counter](#)

Frame Settings

Description

Frame settings are configured using three menu items:

- **Frame Level Disconnect**—Specifies the level at which a disconnect frame is sent. The following options are available:
 - **Active**—Specifies that a disconnect frame (DISC) is sent and an unnumbered acknowledgment (UA) must be received to acknowledge that the link is disconnected. Some systems do not acknowledge the DISC frame with a UA but send a set asynchronous balanced mode frame (SABM) instead. To bring this link up, the system must be configured for a passive disconnect. If a remote system fails to respond to a receive ready (RR) frame enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames (described in section [N2 Retry Counter on page 6-50](#)), then AI296 sends DISC frames continuously.
 - **Passive**—Specifies that the DISC frame is not sent. AI296 responds to an SABM with a UA. If a remote system fails to respond to an RR frame enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames, then AI296 sends SABM frames continuously.
 - **Other**—Specifies that an immediate disconnect frame (DISC) is sent if an RR has been sent enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames and no reply has been received.
- **Frame Window Size**—Specifies the number of frames the link can send before receiving confirmation that the first frame has been received correctly. This means that data can continue to flow in situations where there may be long turn-around time lags without stopping to wait for an acknowledgement.

Menu Item Type

Toggle for frame level disconnect

Data for frame window size

Link Type Availability

MLT and X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.8 for MLT or menu 4.2.11.12.7 for X.25.
2. For 02*Frame Level disconnect, enter 2 to select Active, Passive or Other. The default is Active.
3. For 03 Frame Window size, enter 3, and the window size. The default is 7.

This example displays 02*Frame Level disconnect set to Passive and 03 Frame Window size set to 4.

```
>3 4
Menu 4. 2. 11. 12. 7
01*Interface mode (DTE or DCE)-----DCE
02*Frame Level disconnect (Active, Passive, Other)-----Passive
03 Frame Window size (1 - 7)-----4
```

Configuration in the AI296 Local Menu System

1. Access the MLT or X.25 Link Menu.
2. Select LAPB Menu or X.25 LAPB Menu. The MLT LAPB Menu or X.25 LAPB Menu appears.
3. For Frame Level Disconnect, select Active, Passive, or Other. The default is Active.
4. For Frame Window Size, enter the window size. The default is 7.

This example displays Frame Level Disconnect set to Passive and Frame Window Size set to 4.

```
X.25 LAPB Menu

Link being configured . . . . . 02
Frame Level Disconnect . . . . . Active [Passive] Other
Frame Window Size . . . . . 4
```

Interface Mode

Description

This menu item configures the interface mode as either DTE or DCE. DTE is used for a communications device (typically a terminal or computer) that is the source or destination of signals on a network. DCE is used for a device (typically the modem) that establishes, maintains, and terminates a session on a network. It may also convert signals for transmission.

Menu Item Type

Toggle

Link Type Availability

MLT and X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.7 for MLT or menu 4.2.11.12.8 for X.25.
2. For 01*Interface mode, enter 1 to select DCE or DTE. The default is DCE.

This example displays 01*Interface mode set to DTE.

```
>1
01*Interface mode (DTE or DCE)-----DTE
Menu 4. 2. 11. 12. 8
```

LAPB Timer Settings

Description

The LAPB timer settings are configured using three menu items:

- T1 ack timer—Defines the maximum amount of time from the end of transmission to the receipt of an acknowledgment.
- T2 ack delay timer—Defines the time available from the receipt of a frame until a response has to be transmitted.
- T4 idle timer—Defines the maximum time allowed without the exchange of frames on a data link.

Menu Item Type

Data

Link Type Availability

MLT and X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.7 for MLT or menu 4.2.11.12.8 for X.25.
2. For 05 T1 ack timer, enter 5, and the timer value. The default is 3000.
3. For 06 T2 ack delay timer, enter 6, and the timer value. The default is 4000.
4. For 07 T4 idle timer, enter 7, and the timer value. The default is 25000.

This example displays:

- 05 T1 ack timer set to 19000
- 06 T2 ack delay timer set to 20000
- 07 T4 idle timer set to 50000.

```

>7, 50000
Menu 4. 2. 11. 12. 8
01*Interface mode (DTE or DCE)-----DCE
02*Frame level disconnect (Active, Passive, Other)----- Active
03 Frame Window size (1 - 7)-----7
04 N2 retry count (0 - 255)-----150
05 T1 ack timer (100 - 25500 ms)-----19000
06 T2 ack delay timer (100 - 25500 ms)-----20000
07 T4 idle timer (0 - 200000 ms)-----50000
  
```

Configuration in the AI296 Local Menu System

1. Access the MLT or X.25 Link Menu.
2. Select LAPB Menu Of X. 25 LAPB Menu. The MLT LAPB Menu or X.25 LAPB Menu appears.
3. For T1 Ack Timer, enter the timer value. The default is 3000.
4. For T2 Ack Delay Timer, enter the timer value. The default is 4000.
5. For T4 Idle Timer, enter the timer value. The default is 25000.

This example displays:

- T1 Ack Timer set to 19000
- T2 Ack Delay Timer set to 20000
- T4 Idle Timer set to 50000.

```

MLT LAPB Menu

Link being configured . . . . . 03
Frame Level Disconnect . . . . . [Active] Passive Other
Frame Window Size . . . . . .7
N2 Retry Counter . . . . . 150
T1 Ack Timer . . . . . 19000
T2 Ack Delay Timer . . . . . 20000
T4 Idle Timer . . . . . 50000
  
```

N2 Retry Counter

Description

This menu item defines the maximum number of accepted retransmissions for unacknowledged frames.



Menu Item Type

Data

Link Type Availability

MLT and X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.7 for MLT or menu 4.2.11.12.8 for X.25.
2. For 04 N2 retry count, enter 4, and the retry count. The default is 20.

This example displays 04 N2 retry count set to 150.

```
4, 150
Menu 4. 2. 11. 12. 8
01*Interface mode (DTE or DCE)-----DCE
02*Frame level di sconnect (Acti ve, Passi ve, Other)----- Active
03 Frame Window size (1 - 7)-----7
04 N2 retry count (0 - 255)-----150
```

Configuration in the AI296 Local Menu System

1. Access the MLT Link Menu.
2. Select LAPB Menu. The MLT LAPB Menu appears.
3. For N2 Retry Counter, enter the retry count. The default is 20.

This example displays N2 Retry Counter set to 150.

```
MLT LAPB Menu

Li nk bei ng confi gured . . . . . 03
Frame Level Di sconnect . . . . . [Acti ve] Passi ve Other
Frame Wi ndow Si ze . . . . . 7
N2 Retry Counter . . . . . 150
```



Modem Option Configuration

The following menu items are used for modem option configuration. They are available for asynchronous and asynchronous PPP links:

- [Modem String](#)
- [Dialing Time-out Interval](#)
- [Number of Dial Attempts](#)

Modem String

Description

This menu item configures the modem string, which can be any of the following:

- The text sent to a port when an associated link starts or restarts following the termination of a call
- The dial string the link to uses to dial the modem automatically once it is enabled
- A command that places the modem in auto answer mode so that it is set to receive calls

Menu Item Type

Data

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.14.
2. For 01 Modem string, enter 1, and the modem string. Maximum length is 80 characters.

This example displays 01 Modem string set to 6145553003.

```
>1, 6145553003
01 Modem string-----6145553003
Menu 4. 2. 11. 12. 14
```



Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. Select Modem Setup Menu. The Modem Setup Menu appears.
3. For Modem string, enter the modem string.

This example displays Modem string set to 6145552002.

```
Modem Setup Menu
Link being configured . . . . . 3
Modem string . . . . . 6145552002
```

Dialing Time-out Interval

Description

This menu item configures the amount of time in seconds that the modem waits before redialing a call when connection is not initially established.

Menu Item Type

Data

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.14.
2. For 02 Dialing time-out, enter 2, and the timeout value. The default is 30.

This example displays 02 Dialing time-out set to 10.

```
>2, 10
Menu 4.2.11.12.14
01 Modem string-----6145553003
02 Dialing time-out (5 - 300 s)-----010
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. Select Modem Setup Menu. The Modem Setup Menu appears.
3. For Dialing time-out, enter the time out value. The default is 30.

This example displays **Di al i ng t i me-out set to 10.**

```
Modem Setup Menu

Link being configured . . . . . 3
Modem string . . . . . 6145552002
Di al i ng t i me-out (5 - 300 s) . . . . . 10
```

Number of Dial Attempts

Description

This menu item configures the number of times the modem redials before terminating a call.

Menu Item Type

Data

Link Type Availability

Async and AsyncPPP

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.14.
2. For 03 Number of dial attempts, enter **3**, and the number of redial attempts. The default is 3.

This example displays 03 Number of dial attempts set to 15.

```
>3, 15

Menu 4. 2. 11. 12. 14
01 Modem string-----6145553003
02 Dialing time-out (5 - 300 s)-----010
03 Number of dial attempts (0 - 100, 0 = continuous retry)-----015
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. Select Modem Setup Menu. The Modem Setup Menu appears.
3. For Number of dial attempts, enter the number of redial attempts. The default is 3.



This example displays Number of dial attempts set to 15.

Modem Setup Menu	
Link being configured	3
Modem string	6145552002
Dialing time-out (5 - 300 s).	10
Number of dial attempts (0 - 100, 0 = continuous retry)	15

PPP Authentication Configuration

The following menu items are available for PPP authentication configuration:

- [Local Authentication Settings](#)
- [RAS Option](#)
- [Remote Authentication Settings](#)

Local Authentication Settings

Description

The local authentication settings are configured using three menu items:

- **Local authentication method**—Defines the local authentication method as one of the following options:
 - **PAP**—Specifies the method that uses a two-way handshake that is done only upon initial link establishment.
 - **CHAP**—Specifies the method that verifies the identity of the peer using a three-way handshake that is done upon initial link establishment. Verification may be repeated any time after the link has been established. CHAP also encrypts the user's password over the PPP link to provide added security.
 - **None**—Specifies no authentication will be used.
- **Local PAP/CHAP identity**—Defines the user name for local PAP/CHAP authentication.
- **Local PAP password/CHAP secret**—Defines the password for local PAP/CHAP authentication.

Menu Item Type

Toggle for local authentication method

Data for local PAP/CHAP identity and local PAP password/CHAP secret

Link Type Availability

AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.1.
 - For a synchronous PPP link, access Menu 4.2.11.12.7.

2. For 02*Local Authentication Method, enter 2 to select None, PAP, or CHAP. The default is None.
3. For 03 Local PAP/CHAP Identity, enter 3, and the user name. Maximum length is 24 characters. The default is applied.
4. For 04 Local PAP Password/CHAP Secret, enter 4, and the password. Maximum length is 24 characters. The default is applied.

This example displays:

- 02*Local Authentication Method set to PAP
- 03 Local PAP/CHAP Identity set to bri 24
- 04 Local PAP Password/CHAP Secret set to documentati on.

```

>4, documentati on
Menu 4. 2. 11. 12. 7
01*RAS Option (DI SABLED, RADI US, RADI US_FB, TACACS, TACACS_FB)----- TACACS
02*Local Authentication Method (None, PAP, CHAP)----- PAP
03 Local PAP/CHAP Identity----- bri 24
04 Local PAP Password/CHAP Secret----- documentati on
    
```

Configuration in the AI296 Local Menu System

1. Access the AsyncPPP Link Menu or SyncPPP Link Menu.
2. Select PPP Authentication Menu. The PPP Authentication Menu appears.
3. For Local Authentication Method, select None, PAP, or CHAP. The default is None.
4. For Local PAP/CHAP Identity, enter the user name. The default is applied.
5. For Local PAP Password/CHAP Secret, enter the password. The default is applied.

This example displays:

- Local Authentication Method set to CHAP
- Local PAP/CHAP Identity set to bri 24
- Local PAP Password/CHAP Secret set to documentati on.

```

PPP Authentication Menu

Link being configured . . . . . 3

Authentication Options

Local Authentication Method . . . . . None PAP [CHAP]
RAS Option:
  Di sabl ed RADI US [RADI US/Fa l l back] TACACS+ TACACS+/Fa l l back
Local PAP/CHAP Identity . . . . . bri 24
Local PAP Password/CHAP Secret . . . . . documentati on
    
```

RAS Option

Description

This menu item configures the method AI296 uses to obtain ID and password information for a link. The following options are available:

- Disabling RAS causes AI296 to use local ID and password information to validate the ID and password sent from a remote device.
- Enabling RADIUS causes AI296 to use the ID and password information configured in the RADIUS server to validate the ID and password sent from the remote device.
- Enabling RADIUS with fallback causes AI296 to attempt to use the ID and password information configured in the RADIUS server to validate the ID and password sent from the remote device. If neither of the RADIUS servers respond, AI296 uses the local ID and password (configured in the PPP Authentication Menu) for validation.
- Enabling TACACS+ causes AI296 to use the ID and password information configured in the TACACS+ server to validate the ID and password sent from the remote device.
- Enabling TACACS+ with fallback causes AI296 to attempt to use the ID and password information configured in the TACACS+ server to validate the ID and password sent from the remote device. If neither of the TACACS+ servers respond, AI296 uses the local ID and password (entered in the PPP Authentication Menu) for validation.



Notes: When connecting to a remote PPP device, ensure that the PPP authentication timeout on that device is set to a minimum of 30 seconds. If the network latency is high, set that value to a higher number of seconds.



The TACACS+ server used must support version 1.78 or later of the TACACS+ protocol.

Menu Item Type

Toggle

Link Type Availability

AsyncPPP and SyncPPP



Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.1.
 - For a synchronous PPP link, access Menu 4.2.11.12.7.
2. For 01*RAS Option, enter 1 to select DISABLED, RADIUS, RADIUS_FB, TACACS, OR TACACS_FB. The default is DISABLED.

This example displays 01*RAS Option set to TACACS for an asynchronous PPP link.

```

>1
Menu 4.2.11.12-2.1
01*RAS Option (DISABLED, RADIUS, RADIUS_FB, TACACS, TACACS_FB)----- TACACS
```

Configuration in the AI296 Local Menu System

To configure RADIUS PPP authentication:

1. Access the AsyncPPP Link Menu or SyncPPP Link Menu.
2. Select PPP Authentication Menu. The PPP Authentication Menu appears.
3. For RAS Option, select Disabled, RADIUS, RADIUS/Fail back, TACACS+, OR TACACS+/Fail back. The default is Disabled.

This example displays RAS Option set to RADIUS/Fail back.

```

PPP Authentication Menu

Link being configured . . . . . 3
Authentication Options

Local Authentication Method . . . . . [None] PAP CHAP
RAS Option:
  Disabled RADIUS [RADIUS/Fail back] TACACS+ TACACS+/Fail back
```

Remote Authentication Settings

Description

The remote authentication settings are configured using three menu items:

- Remote authentication method—Defines the remote authentication method as one of the following options:
 - PAP specifies the method that uses a two-way handshake that is done only upon initial link establishment.
 - CHAP specifies the method that verifies the identity of the peer by using a three-way handshake that is done upon initial link establishment. Verification may be repeated any time after the link has been established. CHAP also encrypts the user's password over the PPP link to provide added security.
 - None specifies no authentication will be used.
- Remote PAP/CHAP identity—Defines the user name for remote PAP/CHAP authentication.
- Remote PAP password/CHAP secret—Defines the password for remote PAP/CHAP authentication.

Menu Item Type

Toggle for remote authentication method

Data for remote PAP/CHAP identity and remote PAP password/CHAP secret

Link Type Availability

AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. Do one of the following:
 - For an asynchronous PPP link, access Menu 4.2.11.12-2.1.
 - For a synchronous PPP link, access Menu 4.2.11.12.7.
2. For 05*Remote Authentication Method, enter 5 to select None, PAP, or CHAP. The default is None.
3. For 06 Remote PAP/CHAP identity, enter 6, and the user name. The default is applied.
4. For 07 Remote PAP Password/CHAP Secret, enter 7, and the password. The default is applied.

This example displays:

- 05*Remote Authentication Method **set to** CHAP
- 06 Remote PAP/CHAP Identity **set to** bri 24
- 07 Remote PAP Password/CHAP Secret **set to** documentati on.

```

>7, documentati on
Menu 4. 2. 11. 12. 7
01*RAS Option (DI SABLED, RADI US, RADI US_FB, TACACS, TACACS_FB)----- TACACS
02*Local Authentication Method (None, PAP, CHAP)----- PAP
03 Local PAP/CHAP Identity----- bri 24
04 Local PAP Password/CHAP Secret----- documentati on
05*Remote Authentication Method (None, PAP, CHAP)-----CHAP
06 Remote PAP/CHAP Identity----- bri 24
07 Remote PAP Password/CHAP Secret----- documentati on
    
```

Configuration in the AI296 Local Menu System

1. Access the AsyncPPP or SyncPPP Link Menu.
2. Select PPP Authentication Menu. The PPP Authentication Menu appears.
3. For Remote Authentication Method, select None, PAP, or CHAP. The default is None.
4. For Remote PAP/CHAP Identity, enter the user name. The default is appl i ed.
5. For Remote PAP Password/CHAP Secret, enter the password. The default is appl i ed.

This example displays:

- Remote Authentication Method **set to** CHAP
- Remote PAP/CHAP Identity **set to** bri 24
- Remote PAP Password/CHAP Secret **set to** documentati on.

```

PPP Authentication Menu

Link being confi gured . . . . . 3

Authenti cation Options

Local Authentication Method . . . . . None PAP [CHAP]
RAS Option:
  Di sabled RADI US [RADI US/Fal l back] TACACS+ TACACS+/Fal l back
Local PAP/CHAP Identity . . . . . bri 24
Local PAP Password/CHAP Secret . . . . . documentati on

Remote Authenti cation Method . . . . . None PAP [CHAP]
Remote PAP/CHAP Identity . . . . . bri 24
Remote PAP Password/CHAP Secret . . . . . documentati on
    
```

Quick X.25 Configuration

The Quick X.25 configuration menu is available only in the AI296 local menu system. The following configuration items are available:

- [Frame Settings](#)
- [Interface Mode](#)
- [Number of PVCs](#)
- [Packet Settings](#)
- [Passive Link Settings](#)
- [Port Speed](#)
- [SVC Settings](#)
- [X.121 Local Address](#)

Frame Settings

Description

Frame settings are configured using two menu items:

- **Frame level disconnect**—Specifies the level at which a disconnect frame is sent. The following options are available:
 - **Active**—Acknowledges that a link is disconnected when a disconnect frame (DISC) is sent and an unnumbered acknowledgment (UA) is received. Some systems do not acknowledge the DISC frame with a UA but send a set asynchronous balanced mode frame (SABM) instead. To bring this link up, the system must be configured for a passive disconnect. If a remote system fails to respond to a receive ready (RR) frame enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames (described in section [N2 Retry Counter on page 6-50](#)), then AI296 sends DISC frames continuously.
 - **Passive**—Specifies that the DISC frame is not sent. AI296 responds to an SABM with a UA. If a remote system fails to respond to an RR frame enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames, then AI296 sends SABM frames continuously.
 - **Other**—Specifies that an immediate disconnect frame (DISC) is sent if an RR has been sent enough times to exceed the maximum number of accepted retransmissions for unacknowledged frames and no reply has been received.

- **Frame window size**—Specifies the number of frames the link can send before receiving confirmation that the first frame has been received correctly. This means that data can continue to flow in situations where there may be long turn-around time lags without stopping to wait for an acknowledgement.

Menu Item Type

Toggle for frame level disconnect

Data for frame window size

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For Frame Level Disconnect, select Active, Passive, or Other. The default is Active.
4. For Frame Window Size, enter the window size. The default is 7.

This example displays Frame Level Disconnect set to Passive and Frame Window Size set to 4.

```

                                Quick X.25 Menu

Link being configured . . . . . 02
Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 9600
X25 Passive Link Mode . . . . . [Normal] Passive Extended
Passive Link with Clocking . . . . . Enabled [Disabled]
Frame Level Disconnect . . . . . Active [Passive] Other
Frame Window Size . . . . . 4
    
```

Interface Mode

Description

This menu item configures the interface mode as either DTE or DCE. DTE is used for a communications device (typically a terminal or computer) that is the source or destination of signals on a network. DCE is used for a device (typically the modem) that establishes, maintains, and terminates a session on a network. It may also convert signals for transmission.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select `Quick X.25 Menu`. The Quick X.25 Menu appears.
3. For `Interface Mode`, select DCE or DTE. The default is DCE.

This example displays `Interface Mode` set to DTE.

```
Quick X.25 Menu

Link being configured . . . . . 02
Interface Mode . . . . . [DTE] DCE
```

Number of PVCs

Description

This menu defines the number of PVCs being configured. A PVC is a virtual circuit that is permanently available. PVCs differ from SVCs in that an SVC must be reestablished each time data is to be sent. Once the data has been sent, the SVC disappears. PVCs are more efficient for connections between hosts that communicate frequently.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select `Quick X.25 Menu`. The Quick X.25 Menu appears.
3. For `Number of PVCs`, enter the number of PVCs you want to configure. The default is 0.

This example displays Number of PVCs set to 12.

Quick X.25 Menu			
Link being configured			03
Interface Mode		DTE	[DCE]
Port speed (0=external clocking)			4800
X25 Passive Link Mode	[Normal]	Passive	Extended
Passive Link with Clocking		Enabled	[Disabled]
Frame Level Disconnect	[Active]	Passive	Other
Frame Window Size			7
Max Packet Size	[128]	256	512
Packet Window Size			2
X121 Local Address			
Number of PVCs			12

Packet Settings

Description

Packet settings are configured using two menu items:

- **Max packet size**—Defines the maximum number of bytes permitted for an X.25 packet. This limit governs both transmit and receive packets.
- **Packet window size**—Defines the packet window size, which specifies the number of packets that can be sent before receiving confirmation that the first packet was received correctly.

Menu Item Type

Toggle for max packet size

Data for packet window size

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For Max Packet Size, select 128, 256, or 512. The default is 128.
4. For Packet Window Size, enter the window size. The default is 2.

This example displays Max Packet Size set to 256 and Packet Window Size set to 5.

Quick X.25 Menu			
Link being configured			02
Interface Mode		DTE	[DCE]
Port speed (0=external clocking)			9600
X25 Passive Link Mode	[Normal]	Passive	Extended
Passive Link with Clocking		Enabled	[Disabled]
Frame Level Disconnect	[Active]	Passive	Other
Frame Window Size			7
Max Packet Size		128	[256] 512
Packet Window Size			5

Passive Link Settings

Description

The passive link configuration settings are configured using two menu items:

- X.25 passive link mode—Defines the mode of operation for an X.25 link as one of the following:
 - Normal —Specifies the mode used for normal X.25 service.
 - Passive—Specifies the mode that allows AI296 to operate with the SCCS application of the AT&T 5ESS. The SCCS application requires redundant links at the 5ESS. These links are called SCC0B and SCC1B. Only one link is active at a time. The 5ESS constantly tries to bring up whichever link is idle. If the 5ESS has SCC0B active, it will try to bring up SCC1B. If SCC1B comes up, the 5ESS will drop SCC0B and send information on SCC1B. Passive mode ensures that either SCC0B or SCC1B will be up but not simultaneously.
 - Extended—Specifies the mode that supports passive link capability to the 5ESS over a TCP/IP network. Extended mode ensures that either SCC0A or SCC1A will be up but not simultaneously and will temporarily take down the corresponding link if connections fail or cannot be placed because the corresponding remote link is down.
- Passive link with clocking—Enables or disables an X.25 passive link from supplying a clock value while the link is in the inactive state.



Note: Old AT&T 5ESS interface cards (TN983) require clocking with the passive link set up.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For X25 Passive Link Mode, select Normal, Passive, or Extended. The default is Normal.
4. For Passive Link with Clocking, select Enabled or Disabled. The default is Disabled.

This example displays X25 Passive Link Mode set to Passive and Passive Link with Clocking set to Enabled.


```
Quick X.25 Menu

Link being configured . . . . . 02
Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 9600
X25 Passive Link Mode . . . . . Normal [Passive] Extended
Passive Link with Clocking . . . . . [Enabled] Disabled
```

Port Speed

Description

This menu item defines how many bits of data AI296 can transmit per second over a link.

 **Note:** There is an aggregate baud rate limitation of 359 kilobits per second for link groups 1 to 4, 5 to 8, 9 to 12, and 13 to 16. For example, the total baud rate configured for links 1 to 4 must not exceed 359 kilobits per second. If it does, then the AI296 disables the links and reports an error.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.

3. For `Port speed`, enter the baud rate. The default is 9600.

This example displays `Port speed` set to 128000

```
Quick X.25 Menu

Link being configured . . . . . 02
Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 128000
```

SVC Settings

Description

SVCs are network connections that are established when transmission is required and are disconnected when the session is complete. The SVC settings in the Quick X.25 menu are configured using two menu items:

- `SVC Low`—Defines the minimum LCN used for SVCs.
- `SVC High`—Defines the maximum LCN used for SVCs.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select `Quick X.25 Menu`. The Quick X.25 Menu appears.
3. For `SVC Low`, enter the minimum LCN used for SVCs. This number must be higher than the number of PVCs. The default is 1.
4. For `SVC High`, enter the maximum LCN used for SVCs. This number must be higher than the `SVC Low` value. The default is 1.

This example displays SVC Low set to 250 and SVC High set to 3149.

```

                                Quick X.25 Menu

Link being configured . . . . . 02

Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 128000
X25 Passive Link Mode . . . . . Normal [Passive] Extended
Passive Link with Clocking . . . . . [Enabled] Disabled
Frame Level Disconnect . . . . . [Active] Passive Other
Frame Window Size . . . . . 7
Max Packet Size . . . . . [128] 256 512
Packet Window Size . . . . . 2
X121 Local Address . . . . .
Number of PVCs . . . . . 0
+ PVC Menu
SVC Low . . . . . 250
SVC High . . . . . 3149
    
```

X.121 Local Address

Description

This menu item defines the X.121 address used in the X.25 network. The X.121 address consists of a three-digit Data Country Code (DCC) plus a network digit, together forming the four-digit Data Network Identification Code (DNIC), followed by the Network Terminal Number (NTN) of at most ten digits.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For X121 Local Address, enter the value.



This example displays X121 Local Address set to 59274.

```
Quick X.25 Menu

Link being configured . . . . . 02

Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 9600
X25 Passive Link Mode . . . . . [Normal] Passive Extended
Passive Link with Clocking . . . . . Enabled [Disabled]
Frame Level Disconnect . . . . . [Active] Passive Other
Frame Window Size . . . . . 7
Max Packet Size . . . . . [128] 256 512
Packet Window Size . . . . . 2
X121 Local Address . . . . . 59274
```

RTS/DTR Lead Control Configuration

The following configuration items are available for RTS and DTR lead control configuration:


- [DTR State Configuration](#)
- [RTS State Configuration](#)

DTR State Configuration

Description

DTR is an RS-232 signal sent from a computer or terminal to a modem that indicates that it (the computer or terminal) is able to accept data. DTR lead control is configured using two menu items:

- `DTR connect state`—Sets the DTR connect state to `ON` or `OFF`. `ON` sets DTR to on while the link is connecting and while it is connected. `OFF` turns this functionality off.
- `DTR di sconnect state`—Sets the DTR disconnect state to one of the following options:
 - `ON`—Sets DTR to on when the link disconnects.
 - `OFF`—Sets DTR to off when the link disconnects.
 - `TOGGLE`—Makes DTR pulse when the link disconnects. The pulse polarity is opposite to the sense specified for the connected state.

 **Note:** The RTS/DTR lead control options only take effect when the link is configured as a destination link.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. For an asynchronous or asynchronous PPP link, access Menu 4.2.11.12.13.
2. For `01*DTR connect state`, enter **1** to select `ON` or `OFF`. The default is `ON`.
3. For `02*DTR di sconnect state`, enter **2** to select `ON`, `OFF`, or `TOGGLE`. The default is `OFF`.

This example displays 01*DTR connect state set to OFF and 02*DTR di sconnect state set to TOGGLE.

```

>2
Menu 4.2.11.12.13
01*DTR connect state-----ON
02*DTR di sconnect state (On, Off, Togg le)-----TOGGLE
  
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. Select RTS/DTR Lead Control Options Menu. The RTS/DTR Lead Control Options Menu appears.
3. For DTR connect state, select On or Off. The default is On.
4. For DTR di sconnect state, select On, Off, or Togg le. The default is off.

This example displays DTR connect state set to Off and DTR di sconnect state set to Togg le.

```

RTS/DTR Control Options Menu

Li nk bei ng confi gured . . . . . 3
DTR connect state . . . . . On [Off]
DTR di sconnect state . . . . . On Off [Togg le]
  
```

RTS State Configuration

Description

RTS is an RS-232 signal that is sent from a transmitting terminal to a receiving terminal to request permission to transmit. It is configured using the following menu items:

RTS connect state—Sets the RTS connect state to one of the following options:

- On—Sets RTS to on when the link is connecting or connected.
- Off—Sets RTS to off when the link is connecting or connected.
- FlowControl —Enables RTS to follow the hardware flow control convention.



RTS disconnect state—Sets the RTS disconnect state to one of the following options:

- On—Sets RTS to on when the link disconnects.
- Off—Sets RTS to off when the link disconnects.
- Toggle—Makes RTS pulse when the link disconnects. The pulse polarity is opposite to the sense specified for the connected state.

Menu Item Type

Toggle

Link Type Availability

Async and AsyncPPP and SyncPPP

Configuration in the AI198 Menu System

1. For an asynchronous or asynchronous PPP link, access menu 4.2.11.12.13.
2. For 03*RTS connect state, enter 3 to select ON, OFF, or FLOW CONTROL. The default is ON.
3. For 04*RTS disconnect state, enter 4 to select ON, OFF, or TOGGLE. The default is OFF.

This example displays 03*RTS connect state set to FLOW CONTROL and 04*RTS disconnect state set to TOGGLE.

```
>4
Menu 4.2.11.12.13
01*DTR connect state-----ON
02*DTR disconnect state (On, Off, Toggle)-----OFF
03*RTS connect state (On, Off, Flow Control)-----FLOW CONTROL
04*RTS disconnect state (On, Off, Toggle)-----TOGGLE
```

Configuration in the AI296 Local Menu System

1. Access the Async Link Menu or AsyncPPP Link Menu.
2. Select RTS/DTR Lead Control Options Menu. The RTS/DTR Lead Control Options Menu appears.
3. For RTS connect state, select On, Off, or FlowControl. The default is On.
4. For RTS disconnect state, select On, Off, or Toggle. The default is Off.



This example displays RTS connect state set to FlowControl and RTS disconnect state set to Toggle.

```
RTS/DTR Control Options Menu

Link being configured . . . . . 3
DTR connect state . . . . . On [Off]
DTR disconnect state . . . . . On Off [Toggle]
RTS connect state . . . . . On Off [FlowControl]
RTS disconnect state . . . . . On Off [Toggle]
```


X.25 Parameters Configuration

The following settings are available for X.25 parameter configuration:

- [Maximum Packet Size](#)
- [Packet Window Size](#)
- [Protocol Version](#)
- [X.25 Counter Settings](#)
- [X.25 Facilities Negotiation](#)
- [X.25 Timer Settings](#)
- [X.121 Local Address](#)

Maximum Packet Size

Description

This menu item defines the maximum number of bytes permitted for an X.25 packet. This limit governs both transmit and receive packets.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.8.
2. For 02*Max packet size, enter 2 to select 128, 256, or 512. The default is 128.

This example displays 02*Max packet size set to 512.

```
>2
01*X25 Facilities negotiation----- Menu 4. 2. 11. 12. 8
02*Max packet size (128, 256, 512)-----512
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For Max Packet Size, select 128, 256, or 512. The default is 128.

This example displays Max Packet Size set to 256.

```

X.25 Parameters Menu
Link being configured . . . . . 03
X25 Facilities Negotiation . . . . . Enabled [Disabled]
Max Packet Size . . . . . 128 [256] 512
  
```

Packet Window Size

Description

This menu item defines the packet window size, which specifies the number of packets that can be sent before receiving confirmation that the first packet was received correctly.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.8.
2. For 03 Packet window size, enter 3, and the window size. The default is 2.



Note: To access the menu on a Soneplex NE, set Packet window size to 1.

This example displays 03 Packet window size set to 006.

```

>3,6
Menu 4.2.11.12.8
01*X25 Facilities negotiation----- ON
02*Max packet size (128, 256, 512)-----512
03 Packet window size (1-7)-----006
  
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For Packet Window Size, enter the value. The default is 2.



Note: To access the menu on a Soneplex NE, set Packet window size to 1.

This example displays Packet Window Size set to 6.

```

                                X.25 Parameters Menu

Link being configured . . . . . 03

X25 Facilities Negotiation . . . . . Enabled [Disabled]
Max Packet Size . . . . . 128 [256] 512
Packet Window Size . . . . . 6
  
```

Protocol Version

Description

This menu item defines the protocol version (year) for the current link.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.8.
2. For 17*Protocol version, enter 17 to select 1980, 1984, or 1988. The default is 1984.

This example displays 17*Protocol version set to 1988.

```

>17
                                Menu 4. 2. 11. 12. 8
01*X25 Facilities negotiation-----OFF
02*Max packet size (128, 256, 512)-----128
03 Packet window size (1-7)-----002
04 X121 local address (0-15 decimal digits)-----
05 T20 restart timer (0-3200000ms)-----1750000
06 T21 call timer (0-3200000ms)-----1000000
07 T22 reset timer (0-3200000ms)-----0020000
08 T23 clear timer (0-3200000ms)-----0180000
09 T24 window timer (0-3200000ms)-----2356000
10 T25 data retransmission timer (0-3200000ms)-----1650000
11 T26 interrupt timer (0-3200000ms)-----2300000
12 T28 registration timer (0-3200000ms)-----0090000
13 R20 restart count (0 - 255)-----150
14 R22 reset transmission count (0 - 255)-----025
15 R23 clear retransmission count (0 - 255)-----034
16 R28 registration retransmission count (0 - 255)-----052
17*Protocol version (1980, 1984, 1988)-----1988
  
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For Protocol Version, select 1980, 1984, or 1988. The default is 1984.

This example displays Protocol Version set to 1988.

X.25 Parameters Menu			
Link being configured			03
X25 Facilities Negotiation	Enabled	[Disabled]	
Max Packet Size	[128]	256	512
Packet Window Size			2
X121 Local Address			
T20 Restart Timer			1750000
T21 Call Timer			1000000
T22 Reset Timer			20000
T23 Clear Timer			180000
T24 Window Timer			2356000
T25 Data Retransmission Timer			1650000
T26 Interrupt Timer			2300000
T28 Registration Timer			90000
R20 Restart Counter			150
R22 Reset Transmission Counter			25
R23 Clear Transmission Counter			34
R28 Registration Transmission Counter			52
Protocol Version	1980	1984	[1988]

X.25 Counter Settings

Description

The X.25 counter settings are configured using four menu items:

- R20 restart counter—Defines the maximum number of times a reset can be sent without receiving reset confirmation.
- R22 reset transmission counter—Defines the maximum number of times a reset can be sent without receiving clear confirmation.
- R23 clear transmission counter—Defines the maximum number of times a clear request can be sent without clearing confirmation.
- R28 registration transmission counter—Defines the maximum number of times a registration request can be sent without receiving registration confirmation.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access menu 4.2.11.12.8.
2. For 13 R20 restart count, enter **13**, and the counter value. The default is 1.
3. For 14 R22 reset transmission count, enter **14**, and the counter value. The default is 1.
4. For 15 R23 clear retransmission count, enter **15**, and the counter value. The default is 1.
5. For 16 R28 registration retransmission count, enter **16**, and the counter value. The default is 1.

This example displays:

- 13 R20 restart count **set to 150**
- 14 R22 reset transmission count **set to 25**
- 15 R23 clear retransmission count **set to 34**
- 16 R28 registration retransmission count **set to 52**.

```
>16, 52
Menu 4. 2. 11. 12. 8
01*X25 Facilities negotiation-----OFF
02*Max packet size (128, 256, 512)-----128
03 Packet window size (1-7)-----002
04 X121 local address (0-15 decimal digits)-----
05 T20 restart timer (0-3200000ms)-----1750000
06 T21 call timer (0-3200000ms)-----1000000
07 T22 reset timer (0-3200000ms)-----0020000
08 T23 clear timer (0-3200000ms)-----0180000
09 T24 window timer (0-3200000ms)-----2356000
10 T25 data retransmission timer (0-3200000ms)-----1650000
11 T26 interrupt timer (0-3200000ms)-----2300000
12 T28 registration timer (0-3200000ms)-----0090000
13 R20 restart count (0 - 255)-----150
14 R22 reset transmission count (0 - 255)-----025
15 R23 clear retransmission count (0 - 255)-----034
16 R28 registration retransmission count (0 - 255)-----052
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For R20 restart count, enter the counter value. The default is 1.
4. For R22 reset transmission count, enter the counter value. The default is 1.
5. For R23 clear retransmission count, enter the counter value. The default is 1.

- For R28 registration retransmission count, enter the counter value. The default is 1.

This example displays:

- R20 restart count **set to 150**
- R22 reset transmission count **set to 25**
- R23 clear retransmission count **set to 34**
- R28 registration retransmission count **set to 52**.

X.25 Parameters Menu	
Link being configured	03
X25 Facilities Negotiation	Enabled [Disabled]
Max Packet Size	[128] 256 512
Packet Window Size	2
X121 Local Address	
T20 Restart Timer	1750000
T21 Call Timer	1000000
T22 Reset Timer	20000
T23 Clear Timer	180000
T24 Window Timer	2356000
T25 Data Retransmission Timer	1650000
T26 Interrupt Timer	2300000
T28 Registration Timer	90000
R20 Restart Counter	150
R22 Reset Transmission Counter	25
R23 Clear Transmission Counter	34
R28 Registration Transmission Counter	52

X.25 Facilities Negotiation

Description

This menu item allows the window size and packet size to be negotiated between connections when one end is set differently than the other. When enabled, AI296 initiates negotiation. When disabled, AI296 does not initiate negotiation, but does respond to negotiation attempts made by the remote side.

Menu Item Type

Toggle

Link Type Availability

X.25

Configuration in the AI198 Menu System

- Access Menu 4.2.11.12.8.
- For 01*X25 Facilities negotiation, enter 1 to select ON or OFF. The default is OFF.



This example displays 01*X25 Facilities negotiation set to ON.

```
>1
01*X25 Facilities negotiation----- ON
Menu 4. 2. 11. 12. 8
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For X25 Facilities Negotiation, select Enabled or Disabled. The default is Disabled.

This example displays X25 Facilities Negotiation set to Enabled.

```

X. 25 Parameters Menu
Link being configured . . . . . 03
X25 Facilities Negotiation . . . . . [Enabled] Disabled
    
```

X.25 Timer Settings

Description

The X.25 timer settings are configured using eight menu items:

- T20 restart timer—Defines the amount of time allowed for receipt of a restart confirmation or restart indication after a restart request.
- T21 call timer—Defines the amount of time allowed for receipt of call connected, clear indication, or incoming after a call request.
- T22 reset timer—Defines the amount of time allowed for receipt of a reset confirmation or reset indication after a reset request.
- T23 clear timer—Defines the amount of time allowed for receipt of a clear confirmation or clear indication after a restart request.
- T24 window timer—Defines the amount of time allowed for window status transmission.
- T25 data retransmission timer—Defines the amount of time allowed for T25 data retransmission.
- T26 interrupt timer—Defines the amount of time allowed for receipt of an interrupt confirmation after an interrupt is sent.
- T28 registration timer—Defines the amount of time allowed for receipt of a registration confirmation after a registration request.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.8.
2. For 05 T20 restart timer, enter **5**, and the timer value. The default is 180000.
3. For 06 T21 call timer, enter **6**, and the timer value. The default is 200000.
4. For 07 T22 reset timer, enter **7**, and the timer value. The default is 10000.
5. For 08 T23 clear timer, enter **8**, and the timer value. The default is 180000.
6. For 09 T24 window timer, enter **9**, and the timer value. The default is 75000.
7. For 10 T25 data retransmission timer, enter **10**, and the timer value. The default is 150000.
8. For 11 T26 interrupt timer, enter **11**, and the timer value. The default is 180000.
9. For 12 T28 registration timer, enter **12**, and the timer value. The default is 180000.

This example displays:

- 05 T20 restart timer **set to 1750000**
- 06 T21 call timer **set to 1000000**
- 07 T22 reset timer **set to 20000**
- 08 T23 clear timer **set to 180000**
- 09 T24 window timer **set to 2356000**
- 10 T25 data retransmission timer **set to 1650000**
- 11 T26 interrupt timer **set to 2300000**
- 12 T28 registration timer **set to 90000**.

```
>12, 90000
Menu 4. 2. 11. 12. 8
01*X25 Facilities negotiation-----OFF
02*Max packet size (128, 256, 512)-----128
03 Packet window size (1-7)-----002
04 X121 local address (0-15 decimal digits)-----
05 T20 restart timer (0-3200000ms)-----1750000
06 T21 call timer (0-3200000ms)-----1000000
07 T22 reset timer (0-3200000ms)-----0020000
08 T23 clear timer (0-3200000ms)-----0180000
09 T24 window timer (0-3200000ms)-----2356000
10 T25 data retransmission timer (0-3200000ms)-----1650000
11 T26 interrupt timer (0-3200000ms)-----2300000
12 T28 registration timer (0-3200000ms)-----0090000
```




Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For T20 Restart Timer, enter the timer value. The default is 180000.
4. For T21 Call Timer, enter the timer value. The default is 200000.
5. For T22 Reset Timer, enter the timer value. The default is 10000.
6. For T23 Clear Timer, enter the timer value. The default is 180000.
7. For T24 Window Timer, enter the timer value. The default is 75000.
8. For T25 Data Retransmission Timer, enter the timer value. The default is 150000.
9. For T26 Interrupt Timer, enter the timer value. The default is 180000.
10. For T28 Registration Timer, enter the timer value. The default is 180000.

This example displays:

- T20 Restart Timer set to 1750000
- T21 Call Timer set to 1000000
- T22 Reset Timer set to 20000
- T23 Clear Timer set to 180000
- T24 Window Timer set to 2356000
- T25 Data Retransmission Timer set to 1650000
- T26 Interrupt Timer set to 2300000
- T28 Registration Timer set to 90000.

X.25 Parameters Menu	
Link being configured	03
X25 Facilities Negotiation	Enabled [Disabled]
Max Packet Size	[128] 256 512
Packet Window Size2
X121 Local Address	
T20 Restart Timer	1750000
T21 Call Timer	1000000
T22 Reset Timer	20000
T23 Clear Timer	180000
T24 Window Timer	2356000
T25 Data Retransmission Timer	1650000
T26 Interrupt Timer	2300000
T28 Registration Timer	90000



X.121 Local Address

Description

This menu item defines the X.121 address used in the X.25 network. The X.121 address consists of a three-digit Data Country Code (DCC) plus a network digit, together forming the four-digit Data Network Identification Code (DNIC), followed by the Network Terminal Number (NTN) of at most ten digits.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.8.
2. For 04 X121 Local address, enter 4, and the local address value.

This example displays 04 X121 Local address set to 43729.

```
>4, 43729
Menu 4. 2. 11. 12. 8
01*X25 Facilities negotiation----- ON
02*Max packet size (128, 256, 512)-----512
03 Packet window size (1-7)-----006
04 X121 Local address (0-15 decimal digits)-----43729
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select X.25 Parameters Menu. The X.25 Parameters Menu appears.
3. For X121 Local Address, enter the local address value.

This example displays X121 Local Address set to 59274.

```

X. 25 Parameters Menu
Link being configured . . . . . 03
X25 Facilities Negotiation . . . . . Enabled [Disabled]
Max Packet Size . . . . . 128 [256] 512
Packet Window Size . . . . . 6
X121 Local Address . . . . . 59274
```

Virtual Circuit Configuration

The following settings are available for X.25 parameter configuration:

- [Number of PVCs](#)
- [PVC Configuration Settings](#)
- [SVC Configuration Settings](#)

Number of PVCs

Description

This menu defines the number of PVCs being configured. A PVC is a virtual circuit that is permanently available. PVCs differ from SVCs in that an SVC must be reestablished each time data is to be sent. Once the data has been sent, the SVC disappears. PVCs are more efficient for connections between hosts that communicate frequently.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.9.
2. For 01 Number of PVCs, enter 1, and the number of PVCs. The default is 0.

This example displays 01 Number of PVCs set to 15.

```
>1, 15
01 Number of PVCs (0 - 1024)-----0015
Menu 4. 2. 11. 12. 9
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For Number of PVCs, enter the number of PVCs. The default is 0.

This example displays Number of PVCs set to 12.

```

                                Quick X.25 Menu

Link being configured . . . . . 03

Interface Mode . . . . . DTE [DCE]
Port speed (0=external clocking) . . . . . 4800
X25 Passive Link Mode . . . . . [Normal] Passive Extended
Passive Link with Clocking . . . . . Enabled [Disabled]
Frame Level Disconnect . . . . . [Active] Passive Other
Frame Window Size . . . . . 7
Max Packet Size . . . . . [128] 256 512
Packet Window Size . . . . . 2
X121 Local Address . . . . .
Number of PVCs . . . . . 12
  
```

PVC Configuration Settings

Description

PVCs are configured using four menu items:

- PVC type—Defines the PVC type as Active, Connect on activity, OR Passive.
 - Active—Specifies that the PVC attempts to connect as soon as a link goes up. If an immediate connection is not made, the PVC continues trying to connect at a specified time interval. This time interval is established by the call timer setting.
 - Connect on activity—Specifies that the PVC connects when data is received. This PVC remains dormant until it receives a data packet from the network.
 - Passive—Specifies that PVCs make no attempt to connect.
- LCN low—Defines the minimum logical channel number for the PVCs you want to configure.
- LCN high—Defines the maximum logical channel number for the PVCs you want to configure.
- Timer interval—Defines the timer interval. The timer interval type depends on the PVC type. The following timer intervals are available:
 - Call timer interval—Defines the time interval (in seconds) at which an active PVC will attempt to establish a connection to a destination.
 - Inactivity timer interval—Defines the amount of time (in seconds) after a connect on activity PVC is started before an inactive call is dropped or disconnected.

- **Reset timer interval**—Defines the time interval (in seconds) at which a passive PVC can remain inactive before AI296 resets it. Since passive PVCs do not get reset based on a timer, the only configurable value for this setting is 0. The reset timer interval is only configurable in the AI296 menu system.

Menu Item Type

Toggle for PVC type

Data for LCN low, LCN high, and the timer interval

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.9.2. This menu displays a summary of all the configured PVCs for an X.25 link on AI296.

```
>2
                                     Menu 4. 2. 11. 12. 9. 2
PVC Type  LCN Range  CallTmr  ResetTmr  InActTmr
02+
03+
04+
05+
06+
07+
08+
09+
10+
11+
12+
13+
14+
15+

17 Display first page
18 Next Page
19 Delete entry
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```


2. Enter a value (02 through 15) associated with the PVC to be configured. Menu 4.2.11.12.9.2.1 (the PVC Edit Menu) appears.

```

>3
Menu 4.2.11.12.9.2.1
01*PVC Type (Passive, Active, Connect on activity)-----Passive
02 LCN Low (* for all LCNs for the link)-----0001
03 LCN High-----0001
04 RESET Timer Interval (seconds)-----00000

20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ", value" then push <CR> key
>
  
```

3. For 01*PVC Type, enter 1 to select Passive, Active, or Connect on activity. The default is Passive.
4. For 02 LCN Low, enter 2, and the minimum LCN value. Valid values are 1 to 1024. The default is 1.

 **Note:** An asterisk (*) configures all LCNs for the link with values defined in menu item 4.2.1114.12.9.1.

5. For 03 LCN High, enter 3, and the maximum LCN value. Valid values are 1 to 1024. The default is 1.
6. For 04 RESET Timer Interval, enter 4, and the reset timer interval value.

The timer type, range, and default settings depend on the PVC type. Refer to [Table 6-1](#) for PVC types, timer types, ranges, and defaults.

Table 6-1 PVC and Timer Type

PVC Type	Timer Type	Range	Default
Active	Call Timer	30 to 600 s	30 s
Connect on Activity	Inactivity Timer	1 to 600 s	1 s

Table 6-1 PVC and Timer Type (Continued)

PVC Type	Timer Type	Range	Default
Passive	Reset Timer	0 s	0 s

This example displays:

- 01*PVC Type **set to** Connect
- 02 LCN Low **set to** 5
- 03 LCN High **set to** 15
- 04 INACTIVITY Timer Interval **set to** 240.

```

>4, 240
Menu 4.2.11.12.9.2.1
01*PVC Type (Passive, Active, Connect on activity)-----Connect
02 LCN Low (* for all LCNs for the link)-----0005
03 LCN High-----0015
04 INACTIVITY Timer Interval (seconds)-----00240
```

Configuration in the AI296 Local Menu System

1. Access the X.25 Link Menu.
2. Select Quick X.25 Menu. The Quick X.25 Menu appears.
3. For Number of PVCs, enter the number of PVCs to be configured. The default is 0.
4. For SVC Low, enter a minimum SVC value that is higher than the number of PVCs. Valid values are from 0 to 4095. The default is 1.
5. For SVC High, enter a maximum SVC value that is higher than the minimum SVC value. Valid values are from 0 to 4095. The default is 1.
6. Save your work.
7. From the Quick X.25 Menu, select PVC Menu. The PVC Summary Menu appears.
8. For Edit PVC, enter the number of the PVC to be edited. This value must be in the range of configured PVCs. The PVC Edit Menu appears.
9. For Low PVC, enter the minimum PVC value.
10. For High PVC, enter the maximum PVC value.
11. For PVC Type, select Passive, Active, or ConnectOnActivity. The default is Passive.
12. For Timer Value, select the timer interval value.

The timer type, range, and default settings depend on the PVC type. Refer to [Table 6-2](#) for PVC types, timer types, ranges, and defaults.

Table 6-2 PVC and Timer Type

PVC Type	Timer Type	Range	Default
Active	Call Timer	30 to 600 s	30 s
Connect on Activity	Inactivity Timer	1 to 600 s	1 s
Passive	Reset Timer	0 s	0 s

This example displays:

- Low PVC set to 30
- High PVC set to 50
- PVC Type set to Active
- Timer Value set to 230.

PVC Edit Menu			
Link being configured			03
Low PVC			30
High PVC			50
PVC Type	Passive	[Active]	ConnectOnActivity
Timer Value			230

SVC Configuration Settings

Description

SVCs are network connections that are established when transmission is required and are disconnected when the session is complete. The SVC settings are configured using the following menu items:

- Incoming only SVC low—Defines the minimum LCN used for incoming only SVCs.
- Incoming only SVC high—Defines the maximum LCN used for incoming only SVCs.
- Two-way SVC low—Defines the minimum LCN used for an SVC.
- Two-way SVC high—Defines the maximum LCN used for an SVC.
- Outgoing only SVC low—Defines the minimum LCN used for outgoing only SVCs. AI296 can place calls on outgoing only SVCs greater than the maximum PVC and/or two-way SVC.
- Outgoing only SVC high—Defines the maximum LCN used for outgoing only SVCs. AI296 can place calls on outgoing only SVCs.

Menu Item Type

Data

Link Type Availability

X.25

Configuration in the AI198 Menu System

1. Access Menu 4.2.11.12.9.
2. For 03 Incoming only SVC low, enter **3**, and the minimum LCN used for incoming only SVCs. The default is 0.
3. For 04 Incoming only SVC high, enter **4**, and the maximum LCN used for incoming only SVCs. The default is 0.

Important: AI296 can only receive calls on incoming only SVCs that are greater than the maximum PVC.

4. For 05 Two-way SVC low, enter **5**, and the minimum LCN used for an SVC. The default is 1.

Important: This value must be greater than the number of PVCs and/or incoming SVCs.

5. For 06 Two-way SVC high, enter **6**, and the maximum LCN used for an SVC. The default is 1.

6. For 07 Outgoing only SVC low, enter **7**, and the minimum LCN used for outgoing only SVCs. The default is 0.

7. For 08 Outgoing only SVC high, enter **8**, and the maximum LCN used for outgoing only SVCs. The default is 0.

Important: AI296 can place calls on outgoing only SVCs greater than the maximum PVC and/or two-way SVC.

TID Multiplexing

This chapter provides information on configuring TID multiplexing.

Guide to this Chapter

[Overview](#)

[TID Multiplexing Configuration](#)

[TID Multiplexing Troubleshooting](#)

Overview

AI296 supports TID multiplexing, which enables a single call from an OSS to fan out into multiple calls to various NEs. The initiating call may be X.25, asynchronous, or TCP, but cannot originate from a destination menu. Refer to [Figure 7-1](#) for an illustration of TID multiplexing.

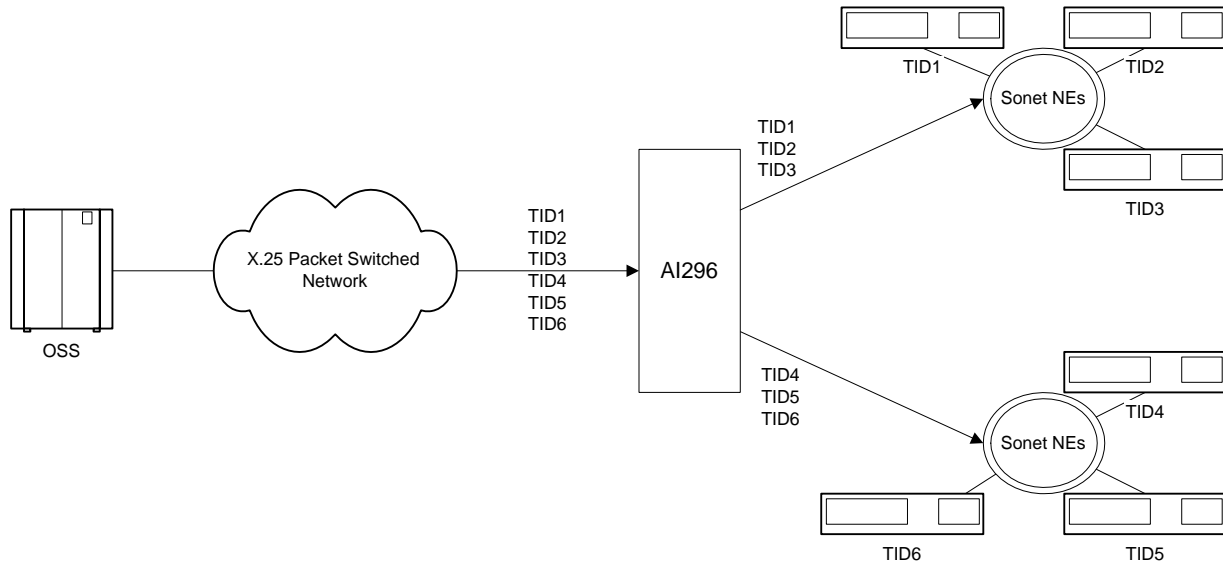


Figure 7-1 TID Multiplexing Overview

In [Figure 7-1](#), AI296 takes a single call from an OSS and routes TL1 commands to various NEs by means of the TID in the TL1 command. Similarly, AI296 receives TL1 responses and NE reporting messages from several NEs and routes these messages to the appropriate OSS. The call to AI296 from the OSS is a parent call. The calls from AI296 to the various NEs are children calls.

After receiving a TL1 command from the OSS, AI296 checks to see if there is an existing connection for each TID. If a connection to the appropriate NE is already established, then AI296 forwards the TL1 command to the NE as specified by the TID.

The following characteristics apply to AI296 when it attempts to connect to an NE:

- If AI296 is unable to establish a connection to an NE, it will buffer the TL1 command and try to reconnect within 2 seconds.
- AI296 tries to connect up to three times if it cannot immediately establish a connection.
- AI296 buffers only one TL1 command for each NE. If a connection is made, AI296 forwards the buffered command to the NE.

- If a connection is not established after four tries or if AI296 receives a TL1 command with an unknown TID, the TL1 command gets discarded and a message gets logged.
- If the OSS is disconnected from AI296, all associated children calls to the NEs are disconnected.




Tip: To access the configuration menu on a Soneplex NE device, you must set the Packet Window Size to 1.

TID Multiplexing Configuration

Establish TID multiplexing by configuring aliases for calls that will go through AI296. Configure a parent alias to accept the incoming call from the OSS. After doing this, configure children aliases to route calls to the various network elements. For more information about aliases, refer to [Chapter 8: Alias and Call Routing Configuration](#).

Configuring the Parent Alias

 **Note:** Kentrox recommends that you do not use connect-on-activity PVCs to establish a parent connection.

Configuration in the AI198 Menu System

1. Log in to AI198.
2. At the prompt, enter `menu` to access the Main Menu.
3. For 08+Configure the alias translation table, enter `8`. The alias configuration menu appears.

```
>8
Menu 8
01 Alias name -*****
02+Simple alias translation
03 Destination -
04 Called address -
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -
11 Caller's protocol -
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

4. For 01 Alias name, enter the alias name for the call coming from the OSS.

- For 02+Simple alias translation, enter 2. Menu 8.2 appears with the available translation options.

```
>2
Menu 8. 2
01 Simple alias translation
02 Multiplexed connection
03 Multiplexed only translation
04 SLC routing translation

21 Exit this menu with no changes
Enter item number and optional ", value" then push <CR> key
>
```

- For 04 SLC routing translation, enter 4. Menu 8 reappears with SLC routing translation selected for menu item 2.
- If you are using single alias translation, for 03 Destination, enter 3, and the IP address of AI296.
- For 08 Call data, enter 8, and the parent name.



Note: When creating the parent name, note that you use the parent name to make the children alias names. For example, if a parent is named PARENT1, valid child names would be PARENT1.1 and PARENT1.2.

- For 09 App. string, enter:


TMUX n [TID: *tid_for_AI296*]

n Defines the maximum number of children connections. Valid values are 1 to 128.

tid_for_AI296 Defines the terminal identifier for AI296.

- For 10 Called protocol, enter 10, =""
- (optional) For 11 Caller's protocol, enter 11, and the caller's protocol.
- Save your changes.

Configuration in the AI296 Local Menu System

 **Note:** To configure aliases in the AI296 local menu system, AI296 must be in standalone mode.

1. Log in to the AI296 Main Menu.
2. From the AI296 Main Menu, select `Alias Menu`. The Alias Summary Menu appears.
3. From the Alias Summary Menu, select `Add Alias`. The Alias Edit Menu appears.

```
Alias Edit Menu

Alias Name . . . . .

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . .
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .


Application String . . . . .
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

Range: {255 characters}
<F1> Help <F2> Send <F4> Close <Ctrl-R> Return to Main Menu
```

4. For `Alias Name`, enter the alias name for the call coming from the OSS.
5. If you are using single alias translation, for `Destination`, enter the IP address of AI296. By entering a destination value, you are specifying the use of single alias translation.
6. For `Call data`, enter the parent name.

 **Note:** When creating the parent name, note that you use the parent name to make the children alias names. For example, if a parent is named PARENT1, valid child names would be PARENT1.1 and PARENT1.2.

7. For Application string, enter:

TMUX*n* [TID: *tid_for_AI296*]

n Defines the maximum number of children connections. Valid values are 1 to 128.

tid_for_AI296 Defines the terminal identifier for AI296.

8. For Called protocol, enter = "".
9. (optional) For Caller's protocol, enter the caller's protocol.
10. Save your changes.

Configuring the Children Aliases

Configuration in the AI198 Menu System

AI296 supports a maximum of 512 child connections. These connections can be X.25, asynchronous, or TCP/IP.

To configure the child aliases:

1. Log into AI198.
2. At the prompt, enter **menu** to access the Main Menu.
3. For 08+Configure the alias translation table, enter **8**. The alias configuration menu appears.

```
>8
Menu 8
01 Alias name -*****
02+Simple alias translation
03 Destination -
04 Called address -
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -
11 Caller's protocol -
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

4. For 01 Alias name, enter:

parent_name.m

parent_name Defines the name you entered for 08 Call data during the parent alias configuration.

m Defines the child number. Valid values are 1 to *n* (specified during the parent alias configuration).

5. For 02+Simple alias translation, enter 2. Menu 8.2 appears with the available translation options.

```
>2
Menu 8. 2
01 Simple alias translation
02 Multiplexed connection
03 Multiplexed only translation
04 SLC routing translation

21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

6. For 04 SLC routing translation, enter 4. Menu 8 re-appears with SLC routing translation selected for menu item 2.
7. If you are using single alias translation, for 03 Destination, enter 3, and the IP address of AI296. By entering a destination value, you are specifying the use of single alias translation.
8. For 04 Called address, enter 4, and the called address.
9. For 07 Caller's address, enter 7, and the caller's address.
10. For 08 Call data, enter 8, and the call data information.

11. For 09 App. string, enter:

TID: *tid*

tid Defines the TID of the destination NE. Maximum length is 20 characters.

12. (optional) For 10 Called protocol, enter 10, and the called protocol.

13. For 11 Caller's protocol, enter 11, ="".

Configuration in the AI296 Local Menu System



Note: To configure aliases in the AI296 local menu system, AI296 must be in standalone mode.

1. Log in to the AI296 Main Menu.
2. From the AI296 Main Menu, select Alias Menu. The Alias Summary Menu appears.
3. From the Alias Summary Menu, select Add Alias. The Alias Edit Menu appears.

```

Alias Edit Menu

Alias Name . . . . .

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . .
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .

Application String . . . . .
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

Range: {255 characters}
<F1> Help <F2> Send <F4> Close <Ctrl-R> Return to Main Menu
    
```

4. For `Alias name`, enter:

`parent_name.m`

`parent_name` Defines the name you entered for `08 Call data` during the parent alias configuration.

`m` Defines the child number. Valid values are 1 to *n* (specified during the parent alias configuration).

5. If you are using single alias translation, for `Destination`, enter the IP address of AI296. By entering a destination value, you are specifying the use of single alias translation.
6. For `Called address`, enter the called address.

7. For `Caller's address`, enter the caller's address.

8. For `Call Data`, enter the call data information.

9. For `Application String`, enter:

TID: `tid`

`tid` Defines the TID of the destination NE. Maximum length is 20 characters.

10. (optional) For `Called protocol`, enter the called protocol.

11. For `Caller's protocol`, enter `=""`.

12. Save your changes.

Example Configurations

The following screens display parent and child alias configurations that do the following:

1. A call comes in on alias 172.16.1.123 at port 1000 (172.16.1.123#1000).
2. The call fans out into two child calls. `09 App. string` in the parent alias configuration determines the number of children; in this case, it is noted by `TMUX2`. The children have the following names: `TL1DM.1` and `TL1DM.2`. These names are established through `08 Call data` in the parent alias configuration. The calls to the first child will be X.25 through link 1 with X.121 address 123456789012 (X25.1.123456789012). The call to the second child will be X.25 through link 2 with X.121 address 987654321098 (X25.2.987654321098).

- AI296 forwards all TL1 commands with TIDs NE-OH-COLUMBUS-1, NE-OH-COLUMBUS-2, and NE-OH-COLUMBUS-3 through the first child connection. It forwards all TL1 commands with TIDs NE-OH-WORTHINGTON-1 and NE-OH-WORTHINGTON-2 through the second child connection.

This example displays the parent alias configuration in the AI198 menu system.

```
>11 TL1
Menu 8
01 Alias name -----172.16.1.23#1000
02+Simple alias translation
03 Destination -
04 Called address -
05 This alias is visible in the destination menu-----YES
06 Link number is (1..16) -
07 Caller's address -
08 Call data -----TL1DM
09 App. string -----TMUX2
10 Called protocol -----=""
11 Caller's protocol -----TL1
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```



This example displays the parent alias configuration in the AI296 menu system.



Note: To configure aliases in the AI296 local menu system, AI296 must be in standalone mode.

```

                                Alias Edit Menu

Alias Name . . . . . 172.16.1.23#1000

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . .
Call Data . . . . . TL1DM

Caller's Protocol . . . . . TL1
Called Protocol . . . . . "="

Application String . . . . . TMUX2
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

                                Range: {255 characters}
<F1> Help <F2> Send                <F4> Close <Ctrl-R> Return to Main Menu
  
```

These examples display two of the child alias configurations in the AI198 menu system.

```

>11 =""
                                                                 Menu 8
01 Alias name -----TL1DM. 1
02+Simple alias translation
03 Destination -
04 Called address -----X25. 1. 123456789012
05 This alias is visible in the destination menu-----YES
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string --TID: NE-OH-COLUMBUS-1 TID: NE-OH-COLUMBUS-2 TID: NE-OH-COLUMBUS-3
10 Called protocol -
11 Caller's protocol -----=""
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>

```

```

>11 =""
                                                                 Menu 8
01 Alias name -----TL1DM. 2
02+Simple alias translation
03 Destination -
04 Called address -----X25. 2. 987654321098
05 This alias is visible in the destination menu-----YES
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -----TID: NE-OH-WORTHINGTON-1 TID: NE-OH-WORTHINGTON-2
10 Called protocol -
11 Caller's protocol -----=""
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>

```

These examples display two of the child alias configurations in the AI296 menu system.



Note: To configure aliases in the AI296 local menu system, AI296 must be in standalone mode.

```

Alias Edit Menu

Alias Name . . . . . TL1DM. 1

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . X25. 1. 123456789012
Call Data . . . . .

Caller's Protocol . . . . . =""
Called Protocol . . . . .

Application String . TID: NE-OH-COLUMBUS-1 TID: NE-OH-COLUMBUS-2 TID: NE-OH-COL
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No

+ Alias Test Menu

<F1> Help <F2> Send          <F4> Close    <Ctrl-R> Return to Main Menu

```

```

Alias Edit Menu

Alias Name . . . . . TL1DM. 2

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . X25. 2. 987654321098
Call Data . . . . .

Caller's Protocol . . . . . =""
Called Protocol . . . . .

Application String . . . . . TID: NE-OH-WORTHINGTON-1 TID: NE-OH-WORTHINGTON-2
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No

+ Alias Test Menu

Range: {255 characters}
<F1> Help <F2> Send          <F4> Close    <Ctrl-R> Return to Main Menu

```


TID Multiplexing Troubleshooting

If an OSS is not getting a response from an NE, it can send a TL1 retrieve header command (RTRV-HDR) to determine if the problem is with the NE or with AI296. The parent connection on AI296 responds to RTRV-HDR commands that have the same TID as the one configured for the card.



Tip: For more information regarding TL1 commands, responses, and formats, refer to the Belcore document GR-833-CORE.

RTRV-HDR

This command is used primarily as an aliveness check.

Format

RTRV-HDR: [*tid*]::*ctag*;

Parameters

tid Defines the TID for AI296. Note that the TID and SID are the same.

ctag Defines the correlation tag used to correlate responses to input commands. Each input command has a unique *ctag*. Maximum length is 6 characters. Responses include the identical *ctag*.

Normal Response Format

This example displays the format of the response that appears when RTRV-HDR is successfully executed:

```
<cr><l f><l f>
<sp><sp><sp><SI D><sp><YY-MM-DD><sp><HH: MM: SS><cr><l f>
M<sp><sp><ctag><sp>COMPLD<cr><l f>;
```

[Table 7-1](#) describes each of the items in the above response format.

Table 7-1 RTRV-HDR Response Format Description

Response Item	Description
cr	Specifies a carriage return.
lf	Specifies a line feed.
sp	Specifies a space.
SID	Specifies a system identifier (system ID).

Table 7-1 RTRV-HDR Response Format Description (Continued)

Response Item	Description
YY-MM-DD	Specifies the date.
HH:MM:SS	Specifies the time of day.
ctag	Specifies the correlation tag.
COMPLD	Specifies completion. The Input requirement is satisfied.

Normal Response Example

This example displays the response that appears when **RTRV-HDR: AI 232: 12345;** is executed.

```
AI 296 97-01-01 05:06:39
M 12345 COMPLD;
```

Error Response Format

If AI296 receives TL1 commands other than **RTRV-HDR** with the same card TID, it responds with a deny message. This example displays the deny message format.

```
<cr><l f><l f>
<sp><sp><sp><SID><sp><YY-MM-DD><sp><HH:MM:SS><cr><l f>
M<sp><sp><ctag><sp>DENY<cr><l f>
<sp><sp><sp><errcde><cr><l f>;
```

[Table 7-2](#) describes each of the items in the above response format.

Table 7-2 Error Response Format Description

Response Item	Description
cr	Specifies a carriage return.
lf	Specifies a line feed.
sp	Specifies a space.
SID	Specifies a system identifier (system ID).
YY-MM-DD	Specifies the date.
HH:MM:SS	Specifies the time of day.
ctag	Specifies the correlation tag.
DENY	Specifies that the input requirement is not satisfied.

Table 7-2 Error Response Format Description (Continued)

Response Item	Description
errcode	Specifies the error code.

Error Response Example

This example displays the response that appears if RTRV-HDR fails.

```
AI 296 97-01-01 05:06:39
M 12345 DENY
I IAC;
```

Diagnostics for TID Multiplexing

To view information on TID multiplexed calls and the associated TIDs, use **di ag-tconn**. This command displays a list of all connections on the card in the same format as **di ag-conn**. However, **di ag-tconn** is not interactive.

Use this command either from the AI296 shell or through AI198 as a **wi nsl c** command. Refer to [diag-tconn on page 9-49](#) for more information.



Alias and Call Routing Configuration

This chapter provides information on configuring aliases and routing calls on AI296.

Guide to this Chapter

[Overview](#)

[Call Routing](#)

[Source/Destination Protocol Tables](#)

[Protocol Processing Modules](#)

[Alias Macros](#)

[Alias Configuration Examples](#)

Overview

AI296 uses aliases to route calls across the backplane of Alswitch. Each incoming call's routing information must match an entry in the alias table, or else the call is rejected. When AI296 is in switch mode, the alias table is stored on AI198. When AI296 is in standalone mode, the alias table is stored in AI296's local memory. For more information about alias translation and macros, see sections [Call Routing on page 8-5](#) and [Alias Macros on page 8-38](#).

[Figure 8-1](#) displays a typical call processing data flow scenario where AI296 is used.

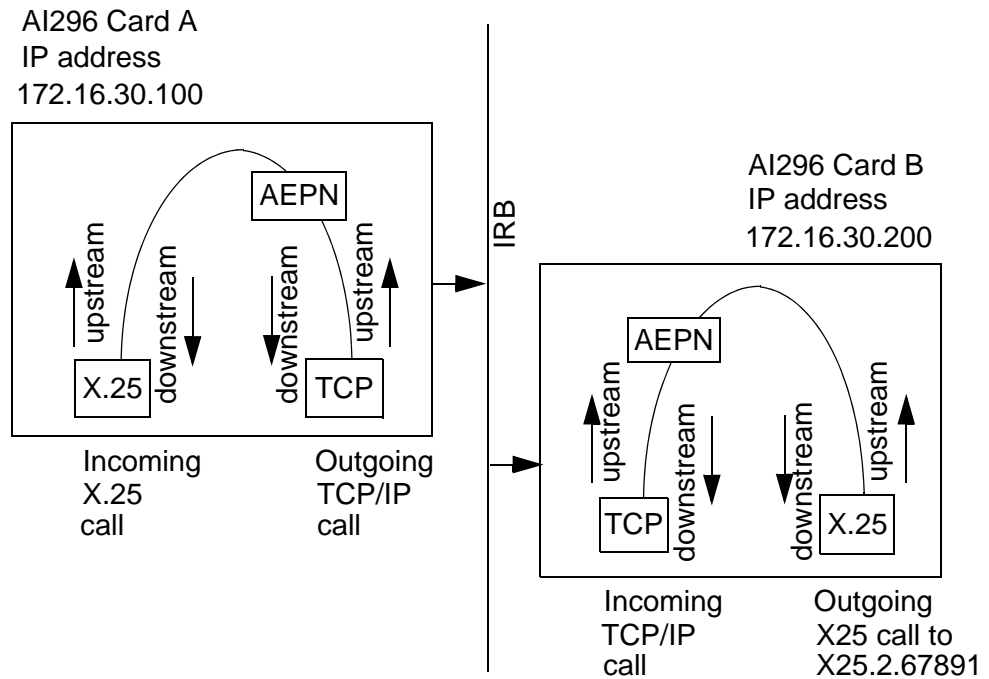


Figure 8-1 Call Data Flow

In [Figure 8-1](#), an X.25 protocol call is coming into AI296 card A and needs to pass over the IRB and be sent out AI296 card B. Refer to the figure to follow the flow of the call.

The following events occur if the data flow is from left to right:

1. The data comes into AI296 card A as an X.25 packet. Refer to [X.25 on page 6-4](#) for information about X.25
2. The data travels upstream and is converted into a TCP call.
3. The data starts downstream through the AEPN protocol option to preserve the packetization. Refer to [AEPN on page 8-29](#) for information about the AEPN protocol.
4. The data is sent out AI296 card A over TCP on the IRB.

5. The TCP packet is received by AI296 card B.
6. The data travels upstream through the AEPN protocol option to preserve packetization.
7. The data packet is converted, travels downstream, and is transmitted out AI296 using an X.25 protocol with the original packetizing characteristics preserved.

This is an example configuration in the AI198 menu system for AI296 A:

```
>8
Menu 8
01 Alias name -----TOCARDB
02+Simple alias translation
03 Destination -
04 Called address -----172.16.30.200 #5000
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -----AEPN
11 Caller's protocol -----=""
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```


This is an example configuration in the AI198 menu system for AI296 B:

```
>8
Menu 8
01 Alias name -----172.16.30.200#5000
02+Simple alias translation
03 Destination -
04 Called address -----X25.2.67891
05 This alias is visible in the destination menu-----YES
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -
11 Caller's protocol -----AEPN
12 Alternate routing alias -


14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```


Call Routing

To route calls with AI296, you must configure an alias for a source and destination protocol.

 **Note:** Aliases created in AI198 are not visible to AI296 when it is running in standalone mode. However, you can configure aliases in the AI296 local menu system when it is in standalone mode.

Configuring an Alias in the AI198 Menu System

 **Note:** Specific configuration information about menu items in the following procedure is located in section [Source/Destination Protocol Tables for the AI198 Menu System on page 8-12](#).

To configure an alias in the AI198 Menu System:

1. Log in to AI198.
2. At the prompt, type `menu`. The main menu appears.
3. To access menu 08+Configure the alias translation table, enter **8**. Menu 8 appears:

```
>8
Menu 8
01 Alias name -*****
02+Simple alias translation
03 Destination -
04 Called address -
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -
11 Caller's protocol -
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

4. For 01 Alias name -, enter **1**, followed by the alias name for the incoming (source) call.

AI198 translates the alias name into a call of the type defined in the remaining alias menu items.



Note: The alias name may include leading, trailing, or embedded wildcard matching characters. You may enter an asterisk (*) which replaces zero or more characters, a question mark (?) which replaces one character, or an alias macro that starts with an equal sign (=).

For information on acceptable alias naming elements and conventions, refer to section [Source/Destination Protocol Tables for the AI198 Menu System on page 8-12](#).

- To access menu 02+Simple alias translation, enter 2. Menu 8.2 appears:

```
>2
Menu 8.2
01 Simple alias translation
02 Multiplexed connection
03 Multiplexed only translation
04 SLC routing translation

21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

- To select 04 SLC routing translation, enter 4. Menu 8 reappears with the SLC routing translation configuration items.


Important: Menu item 04 SLC routing translation is the only valid menu item for AI296. Use SLC routing translations to route calls through cards that support non-time division subchannel (TDS) connections.

- (optional) If you are routing calls between two AI296 cards, enter 3, and the IP address of the remote AI296.
- For 04 Called address -, enter 4, and the the called (destination) address.

The called (destination) address defines the phone number being called. Maximum length is 14 characters. The actual address or an alias macro can be entered here.

9. For 05 This alias is visible in the destination menu, enter 5 to toggle between Yes and No.
This setting specifies if the alias will appear in the welcome screen.
10. (optional) For 08 Call data -, enter 8, and the call user data.
Call data is dependent on the type of SLC being used. It may be directly entered as an alias macro.
11. (optional) For 10 Called protocol -, enter 10, and the called protocol type.
For more information about protocol types, refer to [Protocol Processing Modules on page 8-29](#).
12. (optional) For 11 Caller's protocol -, enter 11, and the caller's protocol type.
For more information about protocol types, refer to [Protocol Processing Modules on page 8-29](#).
13. For 20 Save the changes made, enter 20 to save the alias configuration.
14. Repeat this procedure for additional alias configurations.

Configuring an Alias in the AI296 Menu System

 **Note:** Specific configuration information about menu items in the following procedure is located in section [Source/Destination Protocol Tables for the AI296 Menu System on page 8-20](#).

To configure an alias in the AI296 Menu System:

1. Log in to AI296.
2. At the prompt, type **menu**. The AI296 Main Menu appears.
3. Access the Alias Menu. The Alias Summary Menu appears.

- From the the Alias Summary Menu, select [Add Alias]. The Alias Edit Menu appears:

```

                                     Alias Edit Menu

Alias Name . . . . .

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . .
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .

Application String . . . . .
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

                                     Range: {255 characters}
<F1> Help <F2> Send                 <F4> Close <Ctrl-R> Return to Main Menu

```

- For Alias Name, enter the alias name for the incoming (source) call.

AI296 translates the alias name into a call of the type defined in the remaining alias menu items.



Note: The alias name may include leading, trailing, or embedded wildcard matching characters. You may enter an asterisk (*) which replaces zero or more characters, a question mark (?) which replaces one character, or an alias macro that starts with an equal sign (=).

For information on acceptable alias naming elements and conventions, refer to section [Source/Destination Protocol Tables for the AI296 Menu System on page 8-20](#).

- (optional) If you are routing calls between two AI296 cards, enter the IP address of the remote AI296 in the destination field.
- (optional) For Called Address, enter the called (destination) address.

The called (destination) address defines the phone number being called. Maximum length is 14 characters. The actual address or an alias macro can be entered here.

8. (optional) For `Call Data`, enter the call user data.
Call data is dependent on the type of SLC being used. It may be directly entered as an alias macro.
9. (optional) For `Caller's Protocol`, enter the caller's protocol type.
For more information about protocol types, refer to [Protocol Processing Modules on page 8-29](#).
10. (optional) For `Called Protocol`, enter the called protocol type.
For more information about protocol types, refer to [Protocol Processing Modules on page 8-29](#).
11. For `Display Alias in Destination Menu`, select `Yes` or `No`.
This setting specifies if the alias will appear in the welcome screen.
12. For `Alias Location`, select `Beginning` or `End` to place the alias at the beginning or end of the alias table.
13. Select `<F2> Send` to save the changes.
14. Repeat this procedure for additional alias configurations.

Arranging Aliases in the Alias Table

To arrange aliases in the alias table:

1. From the AI296 Main Menu, access the Alias Menu. The Alias Summary Menu appears:

```
Alias Summary Menu

Find alias:
[Add Alias]
[Sort]
+ alias4                [Move] [Delete]

+ alias2                [Move] [Delete]

+ alias1                [Move] [Delete]

+ alias3                [Move] [Delete]

Range: {255 characters}
<F1> Help              <F4> Close          <Ctrl-R> Return to Main Menu
```

2. From the Alias Summary Menu, select one of the following options:
 - Select `Sort` to sort the aliases alphabetically.
 - Select `Move` next to the desired alias and move it to the top or bottom of the list, or up or down in the list.
3. Select `<F4> Close` to exit the Alias Summary Menu.

Configuring an Alias with X.25 Keep-Alive

Some devices will go to sleep if no data is received within a certain timeframe. You can prevent that by sending a receive-ready (RR) frame periodically on a virtual circuit (VC). You can customize the time period by configuring the application string of the Alias menu.

1. Access the Alias Edit Menu. (For information about accessing the Alias Edit Menu, refer to [Configuring an Alias in the AI296 Menu System on page 8-7.](#))

```
Alias Edit Menu

Alias Name . . . . . X. 25. 4. 1
Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . 10. 39. 3. 89#7
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .

Application String . . . . . X25KA -s 20
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No

Alias Test Menu

Range: {255 characters}
<F1> Help <F2> Send <F4> Close <Ctrl-R> Return to Main Menu
```

2. In the Alias Edit Menu, select `Application String` and enter the X-25 keep-alive string as follows:

`X25KA [-s | -d] period`

where:

X25KA Notifies the 296 that this is the X-25 keep-alive feature.

period The period between each RR on the VC. This value is in tenths of second. In the example above, an RR would be sent every 2 seconds.

-d, -s - If the `-d` flag is given, the destination will send out the RRs if it is an X.25 link. If the `-s` flag is given, then only the source side of the connection will send out the RRs if it is an X.25 link. If neither is given, then it will send out RRs on the side that is an X.25 link and both if both are X.25 links.

Source/Destination Protocol Tables

The following parameters are referred to in the tables:

<i>call_data</i>	Defines the call data. Maximum length is 16 characters.
<i>called_address</i>	Defines the address being called. Maximum length is 14 characters.
<i>caller_address</i>	Defines the address of the caller. Maximum length is 14 characters.
<i>ip_address</i>	Defines the IP address in dotted decimal format. The # symbol must be entered as a field separator between the <i>ip_address</i> field and the <i>tcp_port_number</i> field.
<i>lcn</i>	Defines the logical channel number.
<i>link_number</i>	Defines the number of the serial link.
<i>tcp_port_number</i>	Defines the TCP port number. Valid values are from 1 to 65535.

Source/Destination Protocol Tables for the AI198 Menu System

The following tables are organized according to source protocols. Match the destination protocol with the source protocol to find the appropriate menu item entries:

- [Asynchronous Source Without Breaks \(AI198\)](#)
- [Asynchronous Source With Breaks \(AI198\)](#)
- [X.25 SVC Source Without Breaks \(AI198\)](#)
- [X.25 SVC Source With Breaks \(AI198\)](#)
- [X.25 PVC Source Without Breaks \(AI198\)](#)
- [X.25 PVC Source With Breaks \(AI198\)](#)
- [TCP/IP Source Without Telnet Breaks \(AI198\)](#)
- [TCP/IP Source With Telnet Breaks \(AI198\)](#)

Table 8-1 Asynchronous Source Without Breaks (AI198)


Source	Destination	Menu Item	Information
Async	Async	01	<i>ASY. link_number</i>
		04	PVC
		08	<i>ASY. link_number</i>
Async	X.25 SVC	01	<i>ASY. link_number</i>
		04	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
Async	X.25 PVC	01	<i>ASY. link_number</i>
		04	PVC
		08	<i>X25. link_number. lcn</i>
Async	TCP	01	<i>ASY. link_number</i>
		04	<i>ip_address#tcp_port_number</i>

Table 8-2 Asynchronous Source With Breaks (AI198)


Source	Destination	Menu Item	Information
Async, Async TL1, Async packetized on a CR (or .02 s idle time)	X.25 SVC with X.29 break	01	<i>ASY. link_number</i>
		04	The following options are available: <ul style="list-style-type: none"> • <i>X25. link_number. called_address</i> • <i>X25. link_number. {caller_address call_user_data }</i>  <p>Note: <i>called_address</i> must be a valid X.121 address.</p>
		11	The following options are available: <ul style="list-style-type: none"> • Async: leave blank • Async TL1: TL1 (Refer to TL1 on page 8-33) • Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)
		10	PAD (Refer to PAD on page 8-30)
Async, Async TL1, Async packetized on a CR (or .02 s idle time)	X.25 PVC with X.29 break	01	<i>ASY. link_number</i>
		04	PVC
		08	<i>X25. link_number. lcn</i>
		11	The following options are available: <ul style="list-style-type: none"> • Async: leave blank • Async TL1: TL1 (Refer to TL1 on page 8-33) • Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)
		10	PAD (Refer to PAD on page 8-30)
Async	TCP with telnet break	01	<i>ASY. link_number</i>
		04	<i>ip_address#tcp_port_number</i>
		10	TN (Refer to TN on page 8-35)

Table 8-3 X.25 SVC Source Without Breaks (AI198)


Source	Destination	Menu Item	Information
X.25 SVC	X.25 SVC	01	Call user data or called address or caller's address
		04	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
X.25 SVC	X.25 PVC	01	Call user data or called address or caller's address
		04	PVC
		08	<i>X25. link_number. lcn</i>
X.25 SVC	TCP	01	Call user data or called address or caller's address
		04	<i>ip_address#tcp_port_number</i>
X.25 SVC	AI193-TX TCP with N protocol option	01	Call user data or called address or caller's address
		04	<i>ip_address#tcp_port_number</i>
		10	AEP (Refer to AEP on page 8-29)
X.25 SVC	Async	01	Call user data or called address or caller's address
		04	PVC
		08	<i>ASY. link_number</i>

Table 8-4 X.25 SVC Source With Breaks (AI198)

Source	Destination	Menu Item	Information
X.25 SVC, X.25 SVC and reply to X.29 break	TCP with telnet break	01	Call user data or called address or caller's address
		04	<i>i p_address# tcp_port_number</i>
		11	PAD (Refer to PAD on page 8-30)
		10	TN (Refer to TN on page 8-35)
X.25 SVC	AI193-TX TCP with N protocol option	01	Call user data or called address or caller's address
		04	<i>i p_address# tcp_port_number</i>
		Called protocol	AEP (Refer to AEP on page 8-29)
X.25 SVC, X.25 SVC with TL1 packetizing and X.29 break	Async with async break, Async TL1 with async break, Async packetized on CR (or .02 s idle time)	Alias name	Call user data or called address or caller's address
		Called address	PVC
		Call data	<i>ASY. l i n k_number</i>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> ● SVC: PAD (Refer to PAD on page 8-30) ● SVC with TL1: PAD TL1 (Refer to PAD on page 8-30 and TL1 on page 8-33)
		Called protocol	The following options are available: <ul style="list-style-type: none"> ● Async: leave blank ● Async TL1: TL1 (Refer to TL1 on page 8-33) ● Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)

Table 8-5 X.25 PVC Source Without Breaks (AI198)


Source	Destination	Menu Item	Information
X.25 PVC	X.25 SVC	Alias name	<i>X25. link_number. lcn</i>
		Called address	The following options are available: <ul style="list-style-type: none"> • <i>X25. link_number. called_address</i> • <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
X.25 PVC	X.25 PVC	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
X.25 PVC	TCP	Alias name	<i>X25. link_number. lcn</i>
		Called address	<i>ip_address#tcp_port_number</i>
X.25 PVC	Async	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	ASY. <i>link_number</i>

Table 8-6 X.25 PVC Source With Breaks (AI198)

Source	Destination	Menu Item	Information
X.25 PVC, X.25 PVC and reply to X.29 break	TCP with telnet break	Alias name	<i>X25. link_number. lcn</i>
		Called address	<i>ip_address#tcp_port_number</i>
		Caller's protocol	PAD (Refer to PAD on page 8-30)
		Called protocol	TN (Refer to TN on page 8-35)

Table 8-6 X.25 PVC Source With Breaks (AI198) (Continued)

Source	Destination	Menu Item	Information
X.25 PVC, X.25 PVC with TL1 packetizing and X.29 break	Async with async break, Async TL1 with async break, Async packetized on a CR (or .02 s idle time)	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> • X.25 PVC: PAD (Refer to PAD on page 8-30) • X.25 PVC TL1: PAD TL1 (Refer to PAD on page 8-30 and TL1 on page 8-33)
		Called protocol	The following options are available: <ul style="list-style-type: none"> • Async: leave blank • Async TL1: TL1 (Refer to TL1 on page 8-33) • Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)

Table 8-7 TCP/IP Source Without Telnet Breaks (AI198)


Source	Destination	Menu Item	Information
TCP	X.25 SVC	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> • <i>X25. link_number. called_address</i> • <i>X25. link_number. { caller_address call_user_data }</i> <p> Note: <i>called_address</i> must be a valid X.121 address.</p>
TCP	X.25 PVC	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>

Table 8-7 TCP/IP Source Without Telnet Breaks (AI198) (Continued)

Source	Destination	Menu Item	Information
TCP	TCP	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	<i>ip_address#tcp_port_number</i>
TCP	Async	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>

Table 8-8 TCP/IP Source With Telnet Breaks (AI198)


Source	Destination	Menu Item	Information
TCP	X.25 SVC with X.29 break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  <p>Note: <i>called_address</i> must be a valid X.121 address.</p>
		Caller's protocol	TN (Refer to TN on page 8-35)
		Called protocol	PAD (Refer to PAD on page 8-30)
TCP	X.25 PVC with X.29 break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
		Caller's protocol	TN (Refer to TN on page 8-35)
		Called protocol	PAD (Refer to PAD on page 8-30)

Table 8-8 TCP/IP Source With Telnet Breaks (AI198) (Continued)

Source	Destination	Menu Item	Information
TCP	Async with async break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>
		Caller's protocol	TN (Refer to TN on page 8-35)

Source/Destination Protocol Tables for the AI296 Menu System

The following tables are organized according to source protocols. Match the destination protocol with the source protocol to find the appropriate menu item entries:

- [Asynchronous Source Without Breaks \(AI296\)](#)
- [Asynchronous Source With Breaks \(AI296\)](#)
- [X.25 SVC Source Without Breaks \(AI296\)](#)
- [X.25 SVC Source With Breaks \(AI296\)](#)
- [X.25 PVC Source Without Breaks \(AI296\)](#)
- [X.25 PVC Source With Breaks \(AI296\)](#)
- [TCP/IP Source Without Telnet Breaks \(AI296\)](#)
- [TCP/IP Source With Telnet Breaks \(AI296\)](#)

Table 8-9 Asynchronous Source Without Breaks (AI296)

Source	Destination	Menu Item	Information
Async	Async	Alias name	<i>ASY. link_number</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>

Table 8-9 Asynchronous Source Without Breaks (AI296) (Continued)


Source	Destination	Menu Item	Information
Async	X.25 SVC	Alias name	<i>ASY. link_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
Async	X.25 PVC	Alias name	<i>ASY. link_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
Async	TCP	Alias name	<i>ASY. link_number</i>
		Called address	<i>ip_address#tcp_port_number</i>

Table 8-10 Asynchronous Source With Breaks (AI296)


Source	Destination	Menu Item	Information
Async, Async TL1, Async packetized on a CR (or.02 s idle time)	X.25 SVC with X.29 break	Alias name	<i>ASY. link_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. {caller_address call_user_data }</i>  <p>Note: <i>called_address</i> must be a valid X.121 address.</p>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> ● Async: leave blank ● Async TL1: TL1 (Refer to TL1 on page 8-33) ● Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)
		Called protocol	PAD (Refer to PAD on page 8-30)
Async, Async TL1, Async packetized on a CR (or .02 s idle time)	X.25 PVC with X.29 break	Alias name	<i>ASY. link_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> ● Async: leave blank ● Async TL1: TL1 (Refer to TL1 on page 8-33) ● Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)
		Called protocol	PAD (Refer to PAD on page 8-30)
Async	TCP with telnet break	Alias name	<i>ASY. link_number</i>
		Called address	<i>ip_address#tcp_port_number</i>
		Called protocol	TN (Refer to TN on page 8-35)

Table 8-11 X.25 SVC Source Without Breaks (AI296)


Source	Destination	Menu Item	Information
X.25 SVC	X.25 SVC	Alias name	Call user data or called address or caller's address
		Called address	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
X.25 SVC	X.25 PVC	Alias name	Call user data or called address or caller's address
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
X.25 SVC	TCP	Alias name	Call user data or called address or caller's address
		Called address	<i>ip_address#tcp_port_number</i>
X.25 SVC	AI193-TX TCP with N protocol option	Alias name	Call user data or called address or caller's address
		Called address	<i>ip_address#tcp_port_number</i>
		Called protocol	AEP (Refer to AEP on page 8-29)
X.25 SVC	Async	Alias name	Call user data or called address or caller's address
		Called address	PVC
		Call data	ASY. <i>link_number</i>

Table 8-12 X.25 SVC Source With Breaks (AI296)

Source	Destination	Menu Item	Information
X.25 SVC, X.25 SVC and reply to X.29 break	TCP with telnet break	Alias name	Call user data or called address or caller's address
		Called address	<i>i p_address#tcp_port_number</i>
		Caller's protocol	PAD (Refer to PAD on page 8-30)
		Called protocol	TN (Refer to TN on page 8-35)
X.25 SVC	AI193-TX TCP with N protocol option	Alias name	Call user data or called address or caller's address
		Called address	<i>i p_address#tcp_port_number</i>
		Called protocol	AEP (Refer to AEP on page 8-29)
X.25 SVC, X.25 SVC with TL1 packetizing and X.29 break	Async with async break, Async TL1 with async break, Async packetized on CR (or .02 s idle time)	Alias name	Call user data or called address or caller's address
		Called address	PVC
		Call data	<i>ASY. l i nk_number</i>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> • SVC: PAD (Refer to PAD on page 8-30) • SVC with TL1: PAD TL1 (Refer to PAD on page 8-30 and TL1 on page 8-33)
		Called protocol	The following options are available: <ul style="list-style-type: none"> • Async: leave blank • Async TL1: TL1 (Refer to TL1 on page 8-33) • Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)

Table 8-13 X.25 PVC Source Without Breaks (AI296)


Source	Destination	Menu Item	Information
X.25 PVC	X.25 SVC	Alias name	<i>X25. link_number. lcn</i>
		Called address	The following options are available: <ul style="list-style-type: none"> • <i>X25. link_number. called_address</i> • <i>X25. link_number. { caller_address call_user_data }</i>  Note: <i>called_address</i> must be a valid X.121 address.
X.25 PVC	X.25 PVC	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
X.25 PVC	TCP	Alias name	<i>X25. link_number. lcn</i>
		Called address	<i>ip_address#tcp_port_number</i>
X.25 PVC	Async	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	ASY. <i>link_number</i>

Table 8-14 X.25 PVC Source With Breaks (AI296)

Source	Destination	Menu Item	Information
X.25 PVC, X.25 PVC and reply to X.29 break	TCP with telnet break	Alias name	<i>X25. link_number. lcn</i>
		Called address	<i>ip_address#tcp_port_number</i>
		Caller's protocol	PAD (Refer to PAD on page 8-30)
		Called protocol	TN (Refer to TN on page 8-35)

Table 8-14 X.25 PVC Source With Breaks (AI296) (Continued)

Source	Destination	Menu Item	Information
X.25 PVC, X.25 PVC with TL1 packetizing and X.29 break	Async with async break, Async TL1 with async break, Async packetized on a CR (or .02 s idle time)	Alias name	<i>X25. link_number. lcn</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>
		Caller's protocol	The following options are available: <ul style="list-style-type: none"> • X.25 PVC: PAD (Refer to PAD on page 8-30) • X.25 PVC TL1: PAD TL1 (Refer to PAD on page 8-30 and TL1 on page 8-33)
		Called protocol	The following options are available: <ul style="list-style-type: none"> • Async: leave blank • Async TL1: TL1 (Refer to TL1 on page 8-33) • Async packetized: PKT -P13 -I2 (Refer to PKT on page 8-32)

Table 8-15 TCP/IP Source Without Telnet Breaks (AI296)


Source	Destination	Menu Item	Information
TCP	X.25 SVC	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> • <i>X25. link_number. called_address</i> • <i>X25. link_number. { caller_address call_user_data }</i> <p> Note: <i>called_address</i> must be a valid X.121 address.</p>
TCP	X.25 PVC	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>

Table 8-15 TCP/IP Source Without Telnet Breaks (AI296) (Continued)

Source	Destination	Menu Item	Information
TCP	TCP	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	<i>ip_address#tcp_port_number</i>
TCP	Async	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>

Table 8-16 TCP/IP Source With Telnet Breaks (AI296)


Source	Destination	Menu Item	Information
TCP	X.25 SVC with X.29 break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	The following options are available: <ul style="list-style-type: none"> ● <i>X25. link_number. called_address</i> ● <i>X25. link_number. { caller_address call_user_data }</i>  <p>Note: <i>called_address</i> must be a valid X.121 address.</p>
		Caller's protocol	TN (Refer to TN on page 8-35)
		Called protocol	PAD (Refer to PAD on page 8-30)
TCP	X.25 PVC with X.29 break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>X25. link_number. lcn</i>
		Caller's protocol	TN (Refer to TN on page 8-35)
		Called protocol	PAD (Refer to PAD on page 8-30)

Table 8-16 TCP/IP Source With Telnet Breaks (AI296) (Continued)

Source	Destination	Menu Item	Information
TCP	Async with async break	Alias name	<i>ip_address#tcp_port_number</i>
		Called address	PVC
		Call data	<i>ASY. link_number</i>
		Caller's protocol	TN (Refer to TN on page 8-35)

Protocol Processing Modules

Protocol processing modules are used to process data as it passes through AI296. The following topics are covered in this section:

- [Module Types](#)
- [Module Properties](#)

Module Types

The following module types are available:

- Applied Innovation encapsulation protocol ([AEP](#))
- Applied Innovation encapsulation protocol with network option ([AEPN](#))
- Applied Innovation encapsulation protocol extension ([AEPX](#))
- Asynchronous protocol processing module ([ASY](#))
- BX.25 network module ([BX25NM](#))
- BX.25 session layer module ([BX25S](#))
- End to end reset ([ETER](#))
- Packet assembler disassembler ([PAD](#) and [XXX PAD](#))
- Packetizing module ([PKT](#))
- Record boundary preservation ([RBP](#))
- Translation language one ([TL1](#))
- Telnet module ([TN](#))

AEP

The Applied Innovation encapsulation protocol works with messages traveling between X.25 and TCP/IP protocols. AEP allows for packet preservation of X.25 data when transport is over a TCP/IP network. This protocol keeps packet boundaries intact, which is useful for X.25 applications that are highly sensitive to packet integrity.

AEPN

The Applied Innovation encapsulation protocol with the network option is used for messages traveling between X.25 and TCP/IP protocols. In addition to the services provided by the AEP protocol, the AEPN also passes X.25 Q-bit information over a TCP/IP connection. AEPN also handles special information such as break signals.

AEPX

Applied Innovation encapsulation extension is similar to AEPN, but adds the ability to transport X.25 interrupt/reset packets and interrupt/reset confirmation packets through TCP.

ASY

This module takes a single argument that specifies the string to be transmitted on the outgoing connection when a call is placed. The string typically contains a modem dial sequence.

Optional Parameters

- Echo** Causes local echo from an ASY port.
- Edit** Buffers calls for line editing and sends lines as a whole when ENTER is pressed. Lines can be edited by using BACKSPACE .

BX25NM

The BX.25 network module is used to translate to and from the AEPN module and the BX25S module. Typically, this module is used with the BX25S module. Refer to [BX.25 Configuration on page 6-5](#) for information about configuring BX.25 parameters.

BX25S

The BX.25 session layer module provides the session layer to X.25 that is required for the AMATPS protocol. Typically, this module is used with the BX25NM module. Refer to [BX.25 Configuration on page 6-5](#) for information about configuring BX.25 parameters.

ETER

End to end reset is used on a PVC in the data transfer state to pass reset requests without confirmation. The endpoint is responsible for confirming the reset which is also passed through. This option works only with PVCs and is used on the X.25 side of the connection.

PAD

Packet assembler disassembler works with messages traveling between X.25 and asynchronous protocols. The X.25 protocol does not use break signals, but the asynchronous protocol does. PAD converts X.25 Q-bits into asynchronous breaks, and vice versa.



Note: This protocol processing module can be put on an X.25 data stream.

Defaults

Passes breaks upstream

Passes breaks downstream

Sends no reply to breaks

Optional Parameters

- U Prevents the PAD protocol from passing breaks upstream.
- D Prevents the PAD protocol from passing breaks downstream.
- R Causes the PAD protocol to reply to X.25 breaks.
- 7: 21 Causes the X.3 parameter to behave like X.25. This option sends an interrupt packet (an indication of a break PAD message) and discards data to the terminal.
- M Enables Macstar compatibility.

Example

PAD -U Provides PAD break handling, but prevents the break from being propagated upstream.

XXX PAD

The packet assembler disassembler is a device that collects data from a group of terminals and outputs the data in packets (data organized in a special format). It can also take the data packets from a host and turn them into a character stream that can be transmitted to the terminals. The XXX PAD is defined by the following values:

- X.3—Specifies the parameter for terminal handling functions such as baud rate, flow control, character echoing, and other functions for a connection to an X.25 host.
- X.28—Specifies the user interface for locally controlling a PAD.



Note: The communication server is not a PAD.

- X.29—Specifies a protocol for setting the X.3 parameters via a network connection.

XXX PAD calls can be made from AI296 with a PAD shell command or by defining an alias that routes a call to the destination XXX PAD call. An XXX PAD destination is defined like an X.25 SVC destination with the addition of XXX as the called protocol.

When XXX is used as a call protocol, it can take arguments to set the X.3 parameters, similar to the `set` command used within the `pad` shell command.

PKT

The packetizing module holds data as it arrives until AI296 receives specified characters (such as new lines). Once the packetizing character is received, all of the data that has been held is passed on as a single packet. This module also allows data to be packetized on a timer, which you can set. It also allows you to specify which characters, if any, to be filtered out of the data stream. PKT works on all protocols.

Defaults

Sets no packetizing timer

Sets no idle packetizing timer

Sets no filter characters

Passes the break upstream

Passes the break downstream

Discards unpacketized data when passing the break upstream

Optional Parameters

- Td* Sets the packetizing timer to *d* hundredths of a second. It packetizes *d* hundredths of a second after the last time it was packetized. By setting *d* to zero, the option is turned off.
- I d* Sets the idle packetizing timer to *d* hundredths of a second. It packetizes after *d* hundredths of a second after not receiving any new characters.
- Pd, d, d* Sets the packetizing characters to the numbers entered in each *d* option. Specify up to 16 characters.
- Fd, d, d* Sets the filter characters to the numbers entered in each *d* option. Specify up to 16 characters. It is possible to packetize on a filtered character.
- U* Prevents the passing of breaks upstream.
- D* Prevents the passing of breaks downstream.
- S* Packetizes on a specific sequence of characters. Enter up to 16 characters. The packet module accepts only one -*S* parameter.
- E* Activates local echo back to the original Telnet session. It behaves like an X.25 when X.3 parameter 3 is set to 1.

Examples

- PKT -T6 Provides packetizing and sets the packetizing timer to .06 seconds.

PKT -P0xD, 0x3B	Provides packetizing and sets the packetizing characters to carriage return and semi-colon.
PKT -F10, 127	Provides packetizing and filters out the characters for line feed and delete.
PKT -U	Provides packetizing but prevents breaks from being propagated upstream.
PKT -I 10 -P0x0D -D	Provides packetizing on carriage returns for .10 seconds of idle time and prevents breaks from being propagated downstream.
PKT -S13, 10	Provides packetizing and sets the sequence to carriage return followed by a line feed.

RBP

Record boundary preservation is a Cisco protocol that works with messages traveling between X.25 and TCP/IP protocols. RBP allows for packet preservation of X.25 data when transport is over a TCP/IP network.

RBP is equivalent in functionality to AEP in that X.25 packet boundaries are maintained with the addition of a configurable record boundary.

Optional Parameter

RBP -M*d* Defines the maximum record size in bytes. RBP will split an incoming X.25 data packet across multiple records so that no single record exceeds this value. X.25 packets with this parameter set will be combined as long as the resulting record does not exceed this value. If this value is not set, each X.25 data packet will be converted into exactly one record. Valid range for this parameter is 256 to 1500. The default is no M-bit.

TL1

The Translation Language One module typically works with messages traveling between X.25 and asynchronous protocols. However, it also works with all other protocols. Some OSSs require that each TL1 command/response be fully contained in one X.25 packet. By packetizing on the TL1 termination characters (";<>"), the TL1 module ensures that each TL1 command/response is transmitted in one X.25 packet.

Defaults

Sets no packetizing timer

Sets no idle packetizing timer

Sets no filter characters

Passes the break upstream

Passes the break downstream

Discards unpacketized data when passing the break upstream

Optional Parameters

- Td* Sets the packetizing timer to *d* hundredths of a second. It packetizes *d* hundredths of a second after the last time it was packetized. By setting *d* to zero, this option is turned off.
- I d* Sets the idle packetizing timer to *d* hundredths of a second. It packetizes after *d* hundredths of a second after not receiving any new characters.
- Pd, d, d* Sets the packetizing characters to the numbers entered in each *d* option. Specify up to 16 characters.
- Fd, d, d* Sets the filter characters to the numbers entered in each *d* option. Specify up to 16 characters. It is possible to packetize on a filtered character.
- U** Prevents the passing of breaks upstream.
- D** Prevents the passing of breaks downstream.
- S** Packetizes on a specific sequence of characters. Enter up to 16 characters. The packet module accepts only one -**S** parameter.
- E** Activates local echo back to the original Telnet session. It behaves like an X.25 when X.3 parameter 3 is set to 1.

Examples

- | | |
|---------------|--|
| TL1 -T6 | Provides TL1 packetizing and sets the packetizing timer to .06 seconds. |
| TL1 -F10, 127 | Provides TL1 packetizing and filters out the characters for line feed and delete. |
| TL1 -U | Provides TL1 packetizing and prevents breaks from passing upstream. |
| TL1 -120 -D | Provides TL1 packetizing on TL1 delimiters for 20 seconds of idle time. Prevents breaks from passing downstream. |

TN

The Telnet module filters Telnet commands out of the data stream and processes them appropriately. It also adds commands, as necessary, to data as it travels downstream. When a Telnet break is received, it is converted to an X.25 or asynchronous break as required. When an X.25 or asynchronous break is received from upstream, it is converted to a Telnet break and passed downstream.

Defaults

Passes breaks upstream

Passes breaks downstream

Initiates Telnet negotiation for WILL Echo and WILL SGA

Optional Parameters

- U Prevents passing break upstream.
- D Prevents passing break downstream.
- Ed, *d* Initiates Telnet negotiation for WILL Echo and WILL Suppress Go Ahead (SGA). This is useful when a Telnet connection is made to a remote device that provides an echo. If *d*, *d* is specified, then the Telnet negotiation string is modified. The Telnet negotiation string can be up to 32 characters.

Examples

- | | |
|-------------|---|
| TN -U | Provides Telnet handling, but prevents breaks from being propagated upstream. |
| TN -E | Provides Telnet handling and initiates Telnet negotiation for WILL Echo and WILL SGA. |
| TN -E255, 1 | Provides Telnet handling and causes the Telnet session to send IAC (255) ECHO (1) when the connection is initiated. Initiates WILL SGA. |

Module Properties

Some modules are only used for one specific purpose. For example, the [PKT](#) module buffers all received data until a specified character is received in that data. The [TN](#) module looks for Telnet commands embedded in the data.

[AEP](#), [AEPN](#), [PAD](#), [PKT](#), and [TN](#) can be combined to allow break propagation between the following protocols:

- X.25 (with X.29 break) to asynchronous break
- X.25 (with X.29 break) to Telnet break
- Asynchronous break to X.25 (with X.29 break)
- Asynchronous break to Telnet break
- Telnet break to X.25 (with X.29 break)
- Telnet break to asynchronous break
- X.29 break propagation across TCP connections between two AI296 cards
- Asynchronous break propagation across TCP connections between two AI296 cards
- Response to an indication of X.29 break.



Note: For more information on this, refer to [Source/Destination Protocol Tables on page 8-12](#).

Module Arguments

Some modules use protocol arguments to place restrictions on functionality. For example, the PKT module uses arguments to specify the characters to filter out of data and the characters to packetize in data.

Use the following guidelines when entering arguments:

- Enter values separated by a comma in octal (base 8), hexadecimal (base 16), or decimal (base 10) format. Octal numbers have a leading zero and hexadecimal numbers have a leading 0x. Refer to the [Table 8-17](#) for more information.
- Type characters as their ASCII value.
- Do not use decimal points, tabs, or spaces when entering arguments.
- Enter at least one value when a *d* option is included with an argument. *d* represents the ASCII value for a character. Valid values are from 0 to 255.

[Table 8-17](#) displays descriptions for protocol argument entries.

Table 8-17 Protocol Argument Entries

Entry	Description
0x0d	Specifies a carriage return in hexadecimal format.
59	Specifies a semi-colon in decimal format.
0141	Specifies letter "a" in octal format.
55	Specifies number "7" in ASCII decimal format.

Alias Macros

An alias macro is a program within an alias that translates incoming call requests into outgoing call requests. It is a shortcut that allows a programmer to write many aliases by only writing one macro.

Macros allow routing calls with fewer aliases. Using them with alternate routing provides multiple routes for a single alias.

A macro may be entered for combinations of any or all of the following items: Alias names, called addresses, caller's addresses, call data, application-specific strings, alternate routing aliases.

The following topics are covered in this section:

- [Alias Macro Components](#)
- [Alias Macro Configuration](#)

Alias Macro Components

This section discusses the components in an alias macro, including:

- [Start Symbols](#)
- [Comments](#)
- [Constants](#)
- [Variables](#)
- [Wildcard Symbols](#)
- [Operators](#)
- [Functions](#)

Start Symbols


The start symbol for an alias macro is an equal (=) sign. It is followed by one or more alias macro components.

Comments

Comments are added at the programmer's discretion to explain macro functionality. Comments can be entered either on a blank line or at the end of a line containing a macro. To enter a comment on a blank line, it must begin with two forward slashes (/). To enter a comment in a field with a macro, it must begin with a pound sign (#) at the end of a macro.

This example displays a comment on its own line in the `Application String` field and a comment after a macro in the `Alternate Route` field.

```
Application String . . . . . //links 1-4
Alternate Route . . . . . ="6145550384"#from OH
```

 **Note:** The pound sign (#) can be entered as part of the macro string if it is enclosed in either single or double quotes. The pound sign may be either directly enclosed (`=A+' #' +D(C)`), or the string that the pound sign resides in may be enclosed (`= ' 198. 127. 1. 4#23'`).

Constants

Macro constants are either fixed alphanumeric characters enclosed in single or double quotes or integers between positive and negative 2,147, 483, 647. All strings equal zero. Strings cannot be used in mathematical functions.

Variables

Several variables are recognized by macros. Refer to [Table 8-18](#) for more information.


 **Note:** Variables are not case-sensitive.


Table 8-18 Macro Variables

Variable	Value
c (CUD)	Specifies a “call user data” variable.
A (CALLED)	Specifies a “called address” variable.
B (CALLER)	Specifies a “caller’s address” variable.

Wildcard Symbols

Macros have two available wildcard symbols:

- ? matches any single character.
- * matches zero or more characters.

 **Note:** Alias names that use wildcards are not really macros. Wildcards are not processed in alias names that start with '='.

Operators

Operators are used for calculation of mathematical expressions in alias macros. AI296 evaluates expressions from left to right in order of precedence as shown in [Table 8-19](#). To change the order of precedence, a programmer may enclose a portion of an expression in parentheses () to calculate that portion first.

$4+3*2$ Specifies an equation that equals 10.

$(4+3)*2$ Specifies an equation that equals 14.

AI296 evaluates both regular and boolean logic operators. Refer to [Table 8-19](#) for a list of all available operators in order of precedence.

Table 8-19 Operators in Order of Precedence

Operator	Description
#	Specifies a comment at the ends the alias macro expression.
*	Specifies a multiplication operation.
/	Specifies a division operation.
%	Specifies the remainder of a division operation.
+	Specifies an addition operation.
-	Specifies a subtraction operation.
Expressions that use the following operators return "0" for a false condition and "-1" for true condition:	
<<	Specifies a less than evaluation.
<<=	Specifies a less than or equal to evaluation.
=	Specifies an equal to evaluation.
>	Specifies a greater than evaluation.
>=	Specifies a greater than or equal to evaluation.
<<>	Specifies a not equal to evaluation.
&	Specifies a boolean logical AND evaluation. This requires that two conditions are true before continuing with the evaluation.
^	Specifies a boolean logical exclusive OR evaluation. This requires that one condition or another (not both) is true before continuing with the evaluation.
	Specifies a boolean logical OR evaluation. This requires that one condition or both conditions are true before continuing with the evaluation.

Table 8-19 Operators in Order of Precedence (Continued)

Operator	Description
!	Specifies a boolean logical NOT evaluation. This changes a true condition to a false condition (and vice versa) before continuing with the evaluation.

Functions

Functions are preset command keywords that perform string and value conversions. Some functions can be entered with only a single character. For example, `s` and `swi tch` represent the same function.



Note: Functions are not case-sensitive.

[Table 8-20](#) lists available functions and their descriptions in alphabetical order.

Table 8-20 Alias Macro Functions

Alias Macro Function	Description of Operation
<code>asc(string)</code>	Returns the ASCII integer value of the first character in a string.
<code>chr\$(n)</code>	Returns the character that corresponds to ASCII integer value <i>n</i> .
<code>hex\$(n)</code> or <code>h(n)</code>	Returns the hexadecimal equivalent to decimal value <i>n</i> . For example, <code>=hex\$(31)</code> returns hex value 1F.
<code>if(expression, a, b)</code> or <code>i(expression, a, b)</code>	Returns <i>a</i> if <i>expression</i> is not zero or <i>b</i> if <i>expression</i> is zero.
<code>left\$(string, n)</code> or <code>l(string, n)</code>	Returns the left-most <i>n</i> characters of <i>string</i> . If <i>n</i> is greater than the length of <i>string</i> , the function returns the entire string.
<code>len(string)</code> or <code>n(string)</code>	Returns the length of <i>string</i> .
<code>mid\$(string, x, n)</code> or <code>m(string, x, n)</code>	Returns <i>n</i> characters from <i>string</i> starting with the <i>x</i> th character. If <i>x</i> is greater than the length of <i>string</i> , the function returns a null string. If fewer than <i>n</i> characters follow character <i>x</i> , the function returns to end of the string.

Table 8-20 Alias Macro Functions (Continued)

Alias Macro Function	Description of Operation
mi d\$(string, x) or m(string, x)	Returns characters from <i>string</i> starting with the <i>x</i> th character and continuing to the right-most end character. If <i>x</i> is greater than the length of <i>string</i> , the function returns a null string.
myi p(n)	Returns a string representation of the <i>n</i> th IP address assigned to AI296. <i>n</i> must be greater than 0.
pos(string, char, n) or p(string, char, n)	Returns the position of the <i>n</i> th occurrence of <i>char</i> in <i>string</i> . If there are less than <i>n</i> occurrences of <i>char</i> in <i>string</i> , the function returns the length of <i>string</i> .
ri ght\$(string, n) or r(string, n)	Returns the right-most <i>n</i> characters of <i>string</i> . Returns the entire string if <i>n</i> is greater than the length of the string.
str\$(n) or d(n)	Returns <i>n</i> converted into a decimal string.
swi tch(target_exp, default, exp1, resul t1, exp2, resul t2...) or s(target_exp, default, exp1, resul t1, exp2, resul t2...)	If <i>target_exp</i> matches <i>exp1</i> , the function returns <i>resul t1</i> . If <i>target_exp</i> matches <i>exp2</i> , the function returns <i>resul t2</i> . This continues through all pairs of expressions and results. If <i>target_exp</i> does not match any of the expressions, then <i>default</i> is returned.
val (string) or v(string)	Converts a string to its decimal integer value. For example, =v("032") returns integer 32.
?(n)	Returns the <i>n</i> th wildcard string from the alias match.



Alias Macro Configuration

Often there are several ways to write a macro and get the same result. One programmer will likely design macros differently than another.



Note: From the Alias Menu, you can input a string with * in it and the search will break apart the string using * as a delimiter. The search checks the alias list for an alias name that contains the components. It does not limit the search to the beginning and end of text of the alias as in AI198.

Configuration Examples

This example displays an alias where:

- Alias name 172.16.32.237#30* matches source address 172.16.32.237 with a port number of 30 followed by zero or more characters
- The caller's address is PVC
- Call data = 'ASY.' + D((V(? (1))%6)+1) creates strings from ASY.1 to ASY.6.

```
Alias Edit Menu
Alias Name . . . . . 172.16.32.237#30*
Destination . . . . .
Caller's Address . . . . . PVC
Called Address . . . . .
Call Data . . . . . ='ASY.' +D((V(? (1))%6)+1)
```

This example displays an alias where:

- Alias name 43042* matches source addresses that start with 43042 and may end with zero or more characters
- Called Address = 'ASY.' + D((V(? (1))%6)+1) creates a called address string of ASY.1 through ASY.6.

```
Alias Edit Menu
Alias Name . . . . . 43042*
Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . ='ASY.' +D((V(? (1))%6)+1)
Call Data . . . . . TOSUN
```

This example displays an alias where:

- Alias name `=L(A,P(A,'#',1))-1)=MYIP(1)` matches the base IP address of AI296 with any port number.
- Called address `= '10.9.8.7#' +R(A,LEN(A)-P(A,'#',1))` redirects the call to 10.9.8.7 with the same port number.
- Called protocol `TN` specifies that the Telnet protocol is used for the connection to the called address.

```
Alias Edit Menu

Alias Name . . . . . =L(A,P(A,'#',1))-1)=MYIP(1)

Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . = '10.9.8.7#' +R(A,LEN(A)-P(A,'#',1))
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . . TN
```


Alias Configuration Examples

Examples are given for the following connections:

- [SVC to SVC Connection](#)
- [SVC to PVC Connection](#)
- [PVC to SVC Connection](#)
- [MLT Route](#)

SVC to SVC Connection

In [Figure 8-2](#), the X.25 data on the incoming AI296 is on baseport 16, Link 2 and has a called address of 6145551234. The call continues on the outgoing AI296 on baseport 32, Link 4 and called address 6145553897:

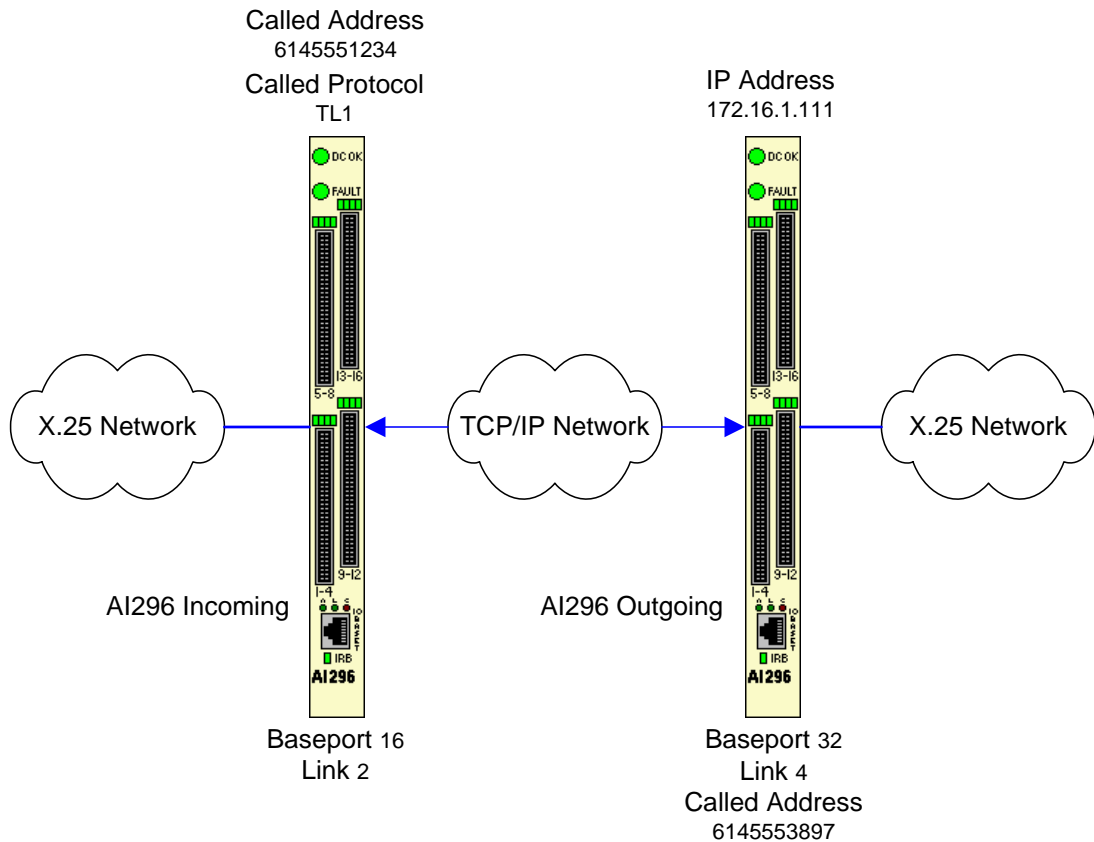


Figure 8-2 SVC to SVC Connection Diagram

This example displays the menu items used to configure the SVC to SVC connection:

```
>10 TL1
Menu 8
01 Alias name -----6145551234
02+SLC Routing
03 Destination -----172. 16. 1. 111
04 Called address -----X25. 4. 6145553897
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -----TL1
11 Caller's protocol -
12 Alternate routing alias -

16+Test macros
17 Show the first entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
```

SVC to PVC Connection

In [Figure 8-3](#), the X.25 data on the incoming AI296 is on baseport 16, link 2 with a called address of 6145551234. The call continues on the outgoing AI296 on baseport 32, link 1:

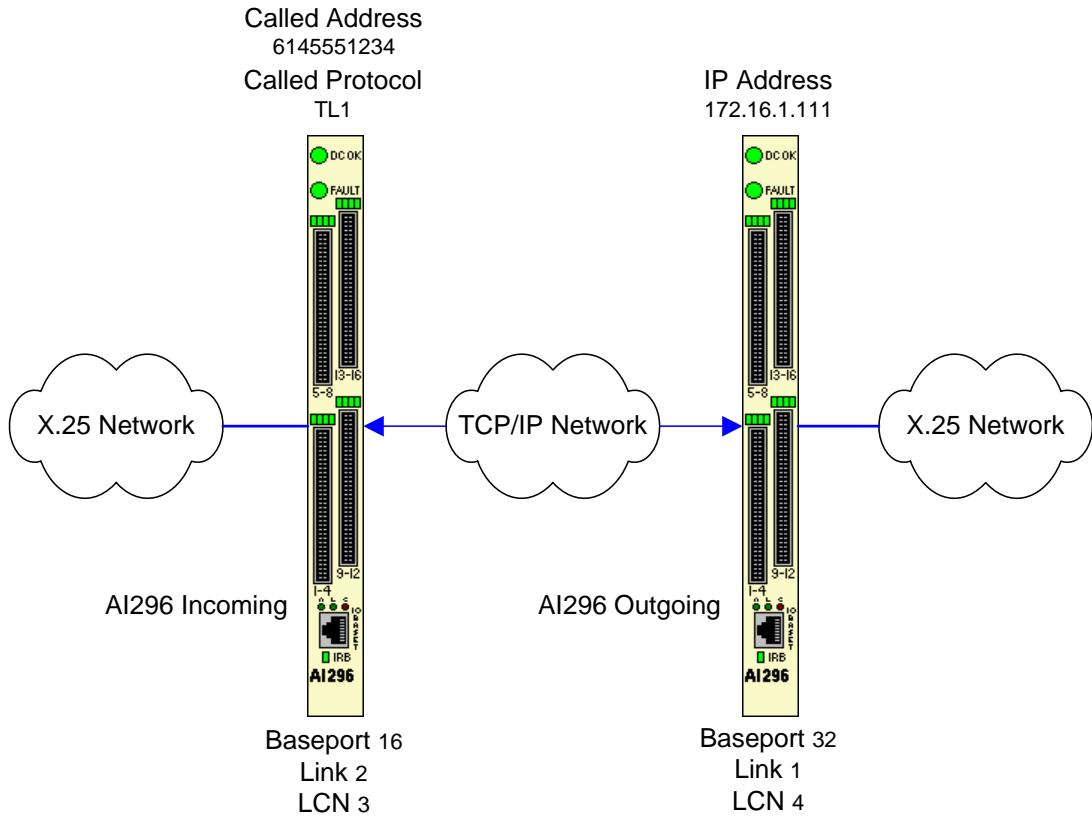


Figure 8-3 SVC to PVC Connection Diagram


This example displays the menu items used to configure an SVC to PVC connection:

```

>10 TL1
Menu 8
01 Alias name -----6145551234
02+SLC Routing
03 Destination -----172. 16. 1. 111
04 Called address -----PVC
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -----X25. 1. 4
09 App. string -
10 Called protocol -----TL1
11 Caller's protocol -
12 Alternate routing alias -

16+Test macros
17 Show the first entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key

```

 **Note:** Refer to [Alias Configuration Examples on page 8-45](#) for a descriptions of all menu items in this example.

PVC to SVC Connection

In [Figure 8-4](#), the incoming X.25 data on the incoming AI296 is on baseport 16, link 2 with the alias of 16.X25.2.3. The call then continues out the outgoing AI296 on baseport 32 and called address 6145553897:

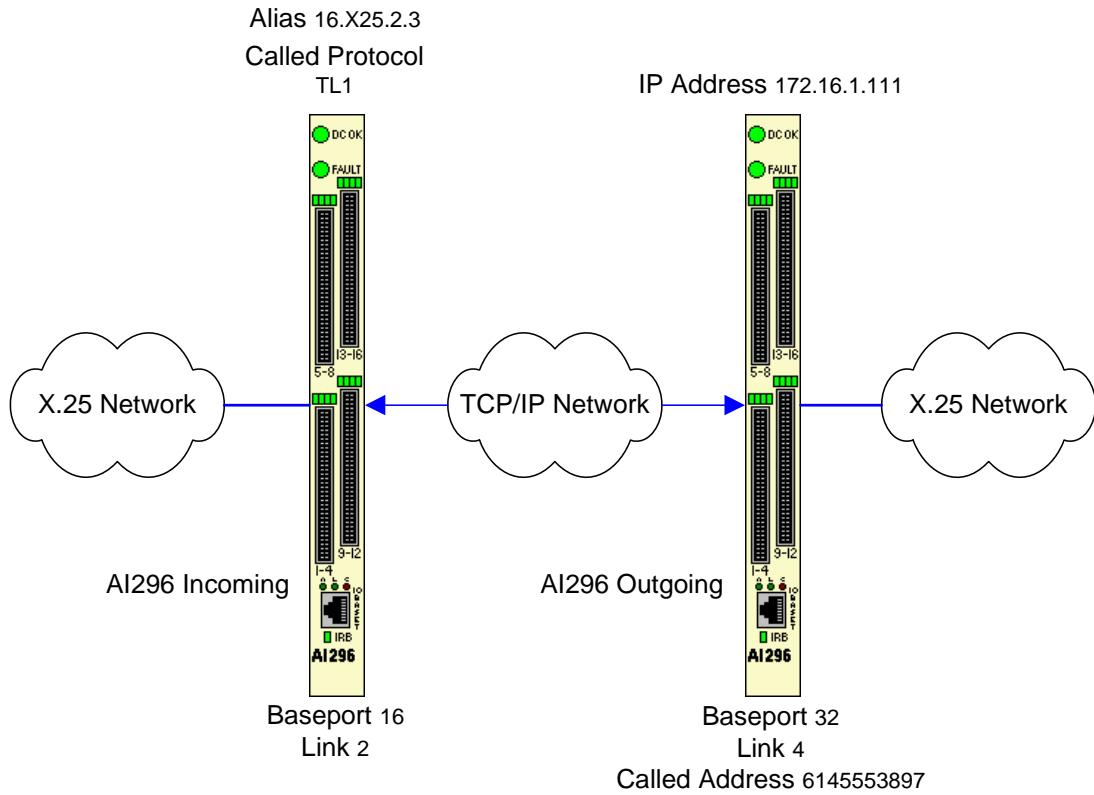


Figure 8-4 PVC to SVC Connection Diagram

This example displays the menu items used to configure a PVC to SVC connection.

```

>10 TL1
Menu 8
01 Alias name -----16. X25. 2. 3
02+SLC Routing
03 Destination -----172. 16. 1. 111
04 Called address -----X25. 4. 6145553897
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -----TL1
11 Caller's protocol -
12 Alternate routing alias -

16+Test macros
17 Show the first entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key

```

 **Note:** Refer to [Alias Configuration Examples on page 8-45](#) for a descriptions of all menu items in this example.

MLT Route

You can use aliases to route MLT call information through a TCP/IP network. The example in [Figure 8-5](#) shows how aliases can be set up to route an MLT call. One alias is configured for an AI296 card that is connected to the host and the other is configured for an AI296 card that is connected to an NE.

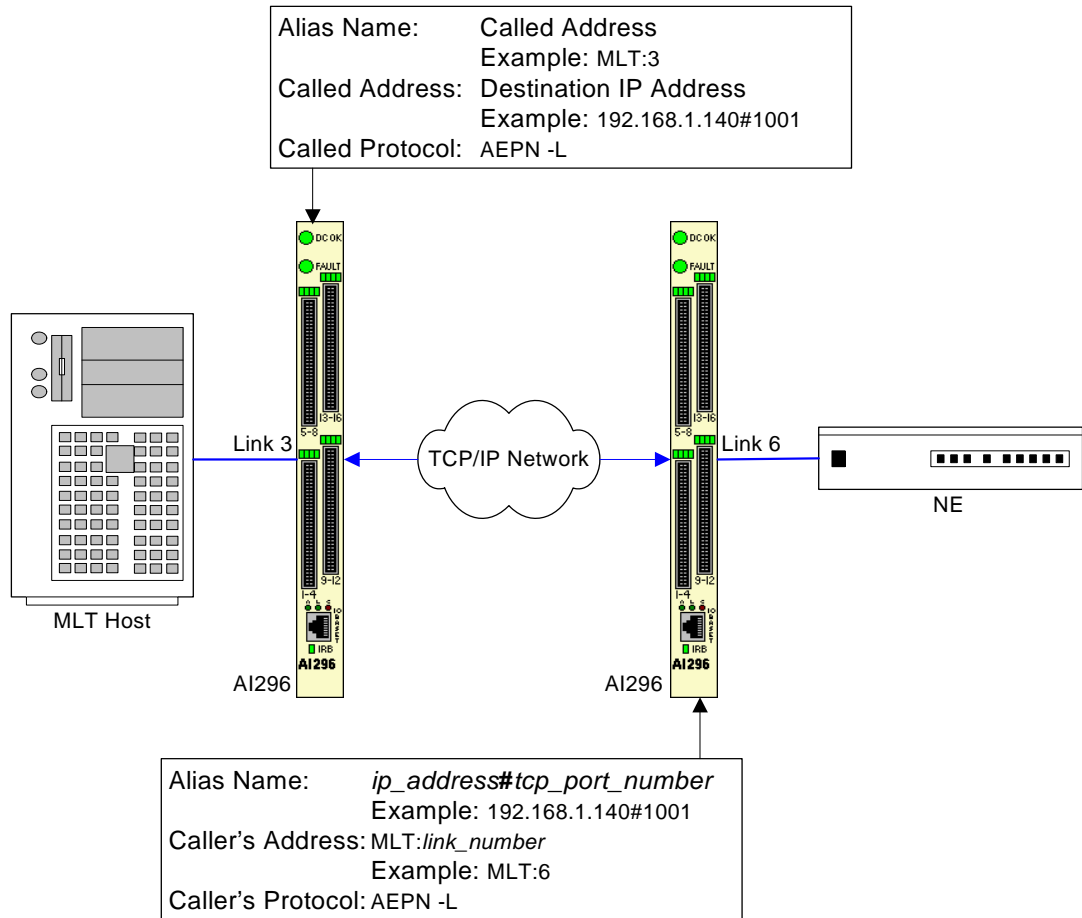


Figure 8-5 MLT Call Routing Example

This example displays the menu items used to configure the MLT host alias shown in [Figure 8-5 on page 8-51](#).

```

10, AEPN -L
                                                    Menu 8
01 Alias name -----MLT: 3
02+Simple alias translation
03 Destination -
04 Called address -----192.168.1.140#1001
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -
09 App. string -
10 Called protocol -----AEPN -L
11 Caller's protocol -
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>

```

This example displays the menu items used to configure the MLT network element alias shown in [Figure 8-5 on page 8-51](#).

```

>11 AEPN -L
                                                    Menu 8
01 Alias name -----192.168.1.140#1001
02+Simple alias translation
03 Destination -
04 Called address -
05 This alias is visible in the destination menu-----NO
06 Link number is (1..16) -
07 Caller's address -----MLT: 6
08 Call data -
09 App. string -
10 Called protocol -
11 Caller's protocol -----AEPN -L
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>

```


Link-to-Link Call Routing

Link-to-link call routing lets users route all SVC calls coming in on one X.25 link to another X.25 link. By using X.25 link-to-link call routing, it is now possible to create a default route for all calls from a specified X.25 link. The alias for the default link-to-link route can route all calls destined for the same link. On previous versions of AI296, users had to create an alias for each unique called address.

In [Figure 8-6](#), NE1 and NE2 place calls to NE3, NE4, and other elements on the X.25 network. Aliases route calls from NE1 and NE2 to the network elements. A link-to-link call route exists between links 1 and 2, and between links 3 and 4. An incoming X.25 SVC call from NE1 that does not match an alias in the table would be routed to Link 2, and an incoming X.25 SVC call from NE2 that does not match an alias in the table would be routed to Link 4.

Important: The link-to-link call alias must be at the end of the alias list. If the link-to-link alias is above an actual destination alias, an X.25 SVC call will be processed by the default link-to-link alias.

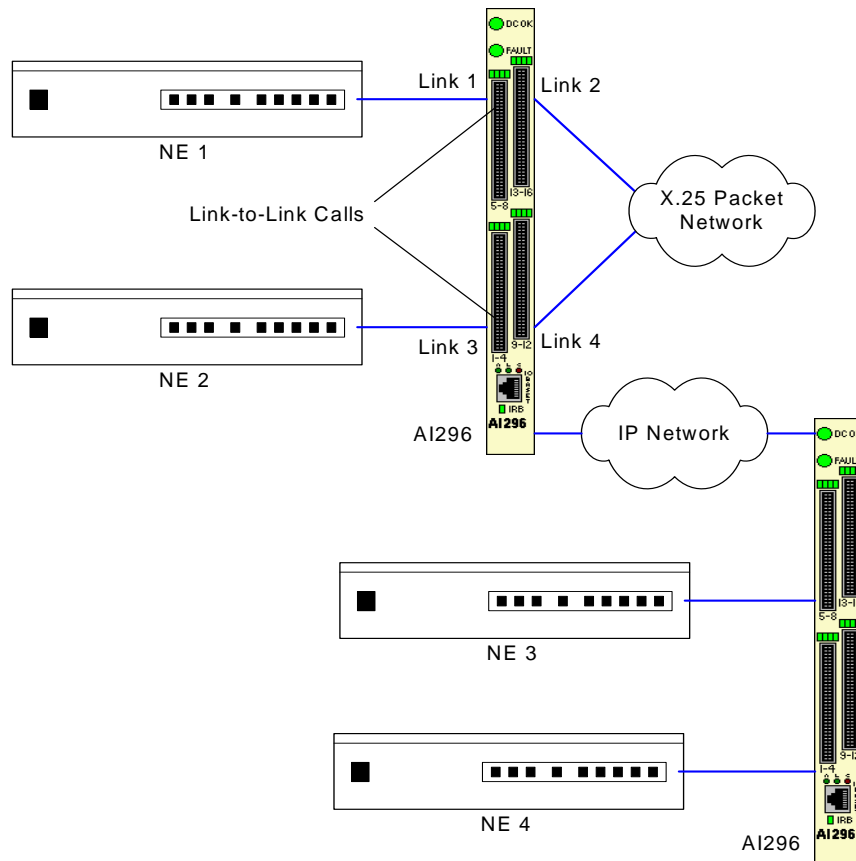


Figure 8-6 Link-to-Link Routing Example

This example displays AI296 configured to listen for all SVC calls on links 1 and 3 and route those calls to links 2 and 4 (as displayed in [Figure 8-6 on page 8-53](#)).

```
Alias Edit Menu

Alias Name . . . . . X25. 1. SVC
Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . X25LL. 2
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .

Application String . . . . .
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

<F1> Help <F2> Send <F4> Close <Ctrl-R> Return to Main Menu
```

```
Alias Edit Menu

Alias Name . . . . . X25. 3. SVC
Destination . . . . .
Caller's Address . . . . .
Called Address . . . . . X25LL. 4
Call Data . . . . .

Caller's Protocol . . . . .
Called Protocol . . . . .

Application String . . . . .
Alternate Route . . . . .
Description . . . . .

Display Alias in Destination Menu . . . . . [Yes] No
Alias Location . . . . . Beginning [End]

+ Alias Test Menu

<F1> Help <F2> Send <F4> Close <Ctrl-R> Return to Main Menu
```

AI296 Commands

This chapter provides information about each AI296 shell command and all AI198 winslc commands that are supported by AI296. These commands perform AI296 system tasks.

Guide to this Chapter

[Commands Overview](#)

Commands Overview

AI296 is configurable directly through the local system using shell commands or through AI198 using winslc commands and the menu system.

Shell Commands

Shell commands offer some of the same functionality available in the AI296 local menu system, including:

- Creating, modifying, or deleting users and passwords
- Accessing the AI296 menu
- Configuring PVCs
- Monitoring performance and diagnostic information
- Pinging an IP address
- Setting up an ARP table
- Setting the trace level.

Shell Connections


Before using the shell commands, a shell connection to AI296 must be established. You can connect locally using an asynchronous port on the AI296 front panel or remotely using a Telnet connection.


Establishing a Local Shell Connection

Establish a local shell connection to AI296 through any port configured as a login port. (By default, all ports are configured as login ports, but only port 1 is enabled.)

1. Use a PC or laptop with terminal emulation software such as HyperTerminal to connect to AI296. For information on operating your particular terminal emulation software, refer to the documentation provided with the program.
2. Set up your terminal emulation software to connect using COM port 1 (**COM1**).
3. Configure COM port 1 with the following parameters:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
4. From within your terminal emulation software, press ENTER to request a login prompt.

5. At the login prompt, enter your user name.
6. At the password prompt, enter your password.

 **Notes:** `ai` is the default user name and password. AI296 allows only five logins using the default password. On the sixth login, AI296 will prompt you to change the default password to a new password.

 Keep a copy of your username and password in a safe place. If you lose or forget your password on AI296 in standalone mode, you must call Kentrox customer service for assistance in gaining access to the card.

The destination menu appears.

7. Enter `ai` .

Establishing a Remote Shell Connection

Establish a remote shell connection to AI296 using AI198 command `tel net` or using another Telnet client. To establish a Telnet session:

1. Use a PC or laptop with terminal emulation software such as HyperTerminal to connect to AI296. For information on operating your particular terminal emulation software, refer to the documentation provided with the program.
2. For user name, enter `ai` .
3. For password, enter `ai` . The destination menu appears.
4. For destination, enter `ai` . The `[296]` prompt appears.

winslc Commands

The winslc commands let the user communicate with AI296 from AI198. Use these commands to enter data, diagnose problems, and retrieve information from AI296.

Displaying winslc Command Logging

To monitor winslc commands, press CTRL+I when logged into AI198 to turn on logging.

Using winslc Commands

To use winslc commands, the user must be logged into AI198 to receive output from AI296. AI198 relays the command to AI296, which processes the command and sends the result to the system log port (as configured in AI198 Menu 1.1). Valid winslc commands are:

- [arp](#)
- [break](#)
- [creset](#)
- [diag-tconn](#)
- [help](#)
- [link](#)
- [linkstat](#)
- [panic](#)
- [ping](#)
- [pvcedit](#)
- [pvclist](#)
- [show](#)
- [staeia](#)
- [stasc](#)
- [tcpoutconn](#)
- [trace](#)
- [update](#)
- [xvc](#)

From the AI198, you can view the available winslc commands by entering the following command:

```
wi nsl c baseport hel p
```

where *baseport* specifies the baseport number of AI296.

Log/Alarm Message Header

To obtain output from winslc commands, enable the activity/alarm log (AI198 Menu 1.1, menu item 01*The activity and alarm log is turned). The first line of the response for most winslc commands shows the following standard log/alarm message header:

```
>@AI 19807: 42: 26 081104 Sev=F Base=016 Msg:
```

[Table 9-1](#) describes the Log/Alarm message header elements.

Table 9-1 Log/Alarm Message Header Elements

Header Element	Description
@AI 198	Specifies the node name for the device that is producing the log/alarm message (in this case, AI198).
7: 42: 26	Specifies the current time.
081104	Specifies the current date.
Sev=F	Specifies the message severity level.
Base=016	Specifies the line card baseport number.
Msg	Introduces the log/alarm message.

aaa

Description

These commands configure TACACS+ accounting, authentication, and authorization settings.

Command Type

shell

Formats

```
aaa
  account { disable | enable }
  authen { disable | enable } [ all | async | telnet | ftp ]
  author { priv-lvl | command }
  chpass
  fallback { disable | enable }
  ppp authen { link_range | * } { disable | enable | fallback }
  profile { priv_range } { profile_name | default }
  retry { retry_count | default }
  stat [ clear ]
  summary
  timeout { timeout_value | default }
```

Parameters

account Enables or disables TACACS+ accounting of user login events and shell command events. An accounting start packet or stop packet is issued each time a user logs into or out of AI296. An accounting start packet is also issued for each shell command that is run.



Note: If enabled, accounting is performed for all shell connection types (Async, Telnet, and FTP), even if authentication is disabled. For information about authentication, refer to command **aaa authen**.

The following parameters are accepted:

- *disable*—Disables TACACS+ accounting.
- *enable*—Enables TACACS+ accounting.

authen Enables or disables TACACS+ authentication for AI296 command shell access. TACACS+ authentication may be enabled on all connections, or on a connection type basis. By default, TACACS+ authentication is disabled on all connection types. The following parameters are accepted:

- `all`—Enables or disables TACACS+ authentication on all connection types.



Note: If no connection type is specified, `all` is automatically selected.

- `async`—Enables or disables TACACS+ authentication on asynchronous link connections.
- `disable`—Disables TACACS+ authentication.
- `enable`—Enables TACACS+ authentication.
- `ftp`—Enables or disables TACACS+ authentication on FTP connections.
- `telnet`—Enables or disables TACACS+ authentication on Telnet connections.

author Configures the TACACS+ authorization method for the AI296 shell. The authorization method can be either privilege level or per-command. Privilege level authorization is based on the `priv-lvl` returned from the TACACS+ server. Per-command authorization requires AI296 to contact the TACACS+ server for each shell command run by a user. Individual commands are then allowed or denied.



Note: Authorization is performed only on the connection types that have enabled authentication. For information about enabling authentication, refer to command `aaa authen`.

The following parameters are accepted:

- `command`—Configures the TACACS+ authorization method that requires to contact the TACACS+ server for each shell command run by a user. Individual commands are then allowed or denied.
- `priv-lvl`—Configures the TACACS+ authorization method based on the `priv-lvl` returned from the TACACS+ server.

chpass Changes the current user's password on the TACACS+ server.



Note: The TACACS+ server may not support, or be configured to support, password changes.

fail back Enables or disables TACACS+ fallback for shell access. If TACACS+ fallback is enabled and attempts to contact all configured TACACS+ servers fail, then AI296's user database is used for authentication and authorization. The AI296 local log file is used for accounting. The following parameters are accepted:

- `disable`—Disables TACACS+ fallback.
- `enable`—Enables TACACS+ fallback.

**ppp
authen** Enables or disables TACACS+ authentication and sets the fallback mode for specified AsyncPPP links.



Note: The link type must be set to AsyncPPP for this command to have any effect.

The following parameters are accepted:

- `*`—Specifies all links.
- `disable`—Disables TACACS+ authentication.
- `enable`—Enables TACACS+ authentication.
- `fail back`—Enables TACACS+ authentication with fallback.
- `link_range`—Defines a link or range of links. Valid values are 1 to 16. Individual values are separated by commas (,) and hyphens (-). For example, `1, 4-6` specifies links 1, 4, 5, and 6.

- profile** Associates a custom profile with a privilege level or range of privilege levels. The following rules apply:
- TACACS+ privilege levels range from 0 to 15.
 - Custom profiles can be associated with privilege levels 2 through 14.
 - Privilege levels 2 through 14 default to the management system profile.
 - Privilege levels 0, 1, and 15 are reserved for the Status, Management, and Supervisor system profiles (respectively).



Note: For information on creating custom profiles, refer to command [profile on page 9-76](#).

Privilege levels are used only if the authorization method is set to `priv-lvl`. The only exception to this occurs under all of the following conditions:

1. The authentication server returns a privilege level.
2. The authorization server cannot be reached.
3. The authorization is set to per-command and fallback is enabled.



Note: For information on configuring the authorization method, refer to command `aaa author`.

The following parameters are accepted:

- `default t`—Removes the association between a range of privilege levels and a profile.
- `priv_range`—Defines the range of privilege levels that will be associated with the profile. Individual values are separated by commas (,) and hyphens (-). For example, `1, 4-6` specifies privilege levels 1, 4, 5, and 6.
- `profile_name`—Specifies the name of an existing profile.

- retry** Configures the number of consecutive connection attempts that are made to a TACACS+ server before the attempt fails. Consecutive attempts are only made if the TACACS+ server responds but refuses a connection. If no response is received from a TACACS+ server before the configured timeout period, then no further connection attempts are made. For information on configuring the timeout period, refer to command [aaa on page 9-6](#).

The following parameters are accepted:

- `retry_count`—Defines the number of consecutive connection attempts that are made. Valid values are 1 to 100.
- `default t`—Resets the number of connection attempts to the default value.

- stat** Displays or clears AAA specific counters and statistics. The following parameter is accepted:
- `clear`—Clears all counters and statistics.
- summary** Displays a summary of all authentication, authorization, and accounting settings.
- timeout** Configures the number of seconds to wait for a response from a TACACS+ server. If no response is received from the server in the allowed number of seconds, the connection attempt fails. The following parameters are accepted:
- `timeout_value`—Defines how long (in seconds) AI296 will wait for a response from a TACACS+ server when a connection attempt is made. Valid values are 1 to 120.
 - `default`—Resets the timeout value to its default.

Command Defaults

Disabled TACACS+ accounting, authentication, and authorization

Examples

The following AAA settings are configured:

- Enabled TACACS+ fallback
- Enabled AAA accounting
- Enabled AAA authentication on telnet connections
- priv-lvl authorization
- Custom profile `newProf` with TACACS+ privilege levels 3 to 5
- Enabled TACACS+ authentication for AsyncPPP links 1 to 9
- 10 retry attempts
- 15 second timeout.

```
[296] aaa fallback enable
[296] aaa account enable
[296] aaa authen enable telnet

WARNING: Potential lock-out:
        At least one TACACS+ server must be enabled for Authentication
        AND at least one TACACS+ server must be enabled for Authorization.

[296] aaa author priv-lvl
[296] aaa profile 3-5 newProf
[296] aaa ppp authen 1-9 enable
[296] aaa retry 10
[296] aaa timeout 15
[296]
```

This example displays a summary of all authentication, authorization, and accounting settings.

```
[296] aaa summary

Async Shell Access:      Local
Telnet Shell Access:    AAA
FTP Access:              Local
Authorization:           Priv-lvl
Accounting:              Enabled
Fallback:                Enabled
AAA Timeout:             15 seconds
AAA Retry Count:        10

Priv-lvl 3: newProf
Priv-lvl 4: newProf
Priv-lvl 5: newProf
[296]
```

This example displays all AAA specific counters and statistics.

```
[296] aaa stats

AAA Statistics
-----
Authentication Attempts: 0
Authentication Failures: 0
Authentication Fallbacks: 0

Authorization Attempts: 0
Authorization Failures: 0
Authorization Fallbacks: 0

Accounting Attempts: 16
Accounting Failures: 0
Accounting Fallbacks: 16

[296]
```

This example displays a successful password change on a TACACS+ server.

```
[296] aaa chpass

Old Password:

New Password:

Re-enter New password:
Password Changed

Password Change was successful
[296]
```

alarm

Description

This command:

- Displays a list of the alarm groups and the overall alarm severity
- Displays alarms for a specified alarm group or for a specified range of severity levels within an alarm group
- Displays alarms by severity level or for a specified range of severity levels
- Clears all non-self-clearing alarm groups and the overall alarm severity
- Clears a specified non-self-clearing alarm group
- Masks a specified alarm group
- Unmasks a specified alarm group.

Command Type

shell

Formats

`al arm`

```
group [ range ]  
-sev [ range ]  
-clear [ group ]  
-mask group  
-unmask group
```

Parameters

- group* Defines the group of alarms to display, clear, mask, or unmask. Valid values are existing alarm groups. The following parameters is accepted:
- range*—Defines a range of alarm severity levels to display. Valid values are 1 to 32. Individual values in the range are separated by hyphens (-).
- sev Displays all alarms or a range of alarms based severity level. The following parameters is accepted:
- range*—Defines a range of alarm severity levels to display. Valid values are 1 to 32. Individual values in the range are separated by hyphens (-).

-clear Clears all non-self-clearing alarm groups or a specified non-self-clearing alarm group.



Note: Only non-self-clearing alarm groups can be manually cleared. Self-clearing alarms clear themselves when the problem that caused the alarm is resolved.

The following parameter is accepted:

group—Defines the group of alarms to display, clear, mask, or unmask. Valid values are existing alarm groups.

-mask Prevents a specified alarm group from affecting overall alarm severity. The following parameter is accepted:

group—Defines the group of alarms to display, clear, mask, or unmask. Valid values are existing alarm groups.

-unmask Allows a specified alarm group to affect overall alarm severity. The following parameter is accepted:

group—Defines the group of alarms to display, clear, mask, or unmask. Valid values are existing alarm groups.

Examples

This example displays a list of the alarm groups and the overall alarm severity.

```
[296]alarm
Alarm Group Sev Date & Time Message (most recent, most severe in group)
-----
*general      0 00-00 00:00
links        0 06-01 00:00 Link 1 up.
-----
*not self-clearing  () masked
Overall alarm severity: 0
[296]
```



This example displays all system alarms in group `links`.

```
[296]alarm links
Num Sev Date & Time Message
-----
  1  0 06-01 00:00 Link 1 up.
  2  0 06-01 00:00 Link 2 down.
  3  0 06-01 00:00 Link 3 down.
  4  0 06-01 00:00 Link 4 down.
  5  0 06-01 00:00 Link 5 down.
  6  0 06-01 00:00 Link 6 down.
  7  0 06-01 00:00 Link 7 down.
  8  0 06-01 00:00 Link 8 down.
  9  0 06-01 00:00 Link 9 down.
 10  0 06-01 00:00 Link 10 down.
 11  0 06-01 00:00 Link 11 down.
 12  0 06-01 00:00 Link 12 down.
 13  0 06-01 00:00 Link 13 down.
 14  0 06-01 00:00 Link 14 down.
 15  0 06-01 00:00 Link 15 down.
 16  0 06-01 00:00 Link 16 down.
-----
'links' alarm group severity: 0
[296]
```

This example displays alarms for links 5-8 in group `links`.

```
[296]alarm links 5-8
Num Sev Date & Time Message
-----
  5  0 06-01 00:00 Link 5 down.
  6  0 06-01 00:00 Link 6 down.
  7  0 06-01 00:00 Link 7 down.
  8  0 06-01 00:00 Link 8 down.
-----
'links' alarm group severity: 0
[296]
```

This example displays all alarms by severity level.

```
[296]alarm -sev
Alarm Group Num Sev Date & Time Message
-----
links          1  4 06-13 14:40 Link 1 is enabled but has not come up.
links          5  4 06-13 14:40 Link 5 is enabled but has not come up.
links         10  4 06-13 14:40 Link 10 is enabled but has not come up.
links         12  4 06-13 14:40 Link 12 is enabled but has not come up.
general        1  6 06-13 14:40 Unable to find auto ID name of 222 board
-----
( ) masked
[296]
```


This example displays all alarms that have a severity level between 4 and 7.

```
[296]alarm -sev 4-7
Alarm Group Num Sev Date & Time Message
-----
links          1  4  06-13 14:40 Link 1 is enabled but has not come up.
links          5  4  06-13 14:40 Link 5 is enabled but has not come up.
links         10  4  06-13 14:40 Link 10 is enabled but has not come up.
links         12  4  06-13 14:40 Link 12 is enabled but has not come up.
general        1  6  06-13 14:40 Unable to find auto ID name of 222 board
-----
( ) masked
[296]
```

This example displays the clearing of all non-self-clearing alarm groups.

```
[296]alarm -clear
Alarm groups cleared.
Overall alarm severity set to 0.
[296]
```

This example displays the clearing of non-self-clearing alarm group `general`.

```
[296]alarm -clear general
Alarm group cleared.
[296]
```

This example displays the prevention of alarm group `links` from affecting the overall alarm severity.

```
[296]alarm -mask links
Alarm group masked.
[296]
```

This example displays the unmasking of alarm group `links`.

```
[296]alarm -unmask links
Alarm group unmasked.
[296]
```

arp

Description

This command displays, deletes, or adds entries in the ARP cache.

Command Types

shell and winslc

Formats

For the shell:

```
arp
  -a [ ip_address ]
  -d ip_address
  -s ip_address mac_address
```

For the winslc command:

```
winslc baseport arp
  -a [ ip_address ]
  -d ip_address
  -s ip_address mac_address
```

Parameters


- a Displays all entries in the ARP cache table or just the *ip_address* entry. The following parameter is accepted:
 - ip_address*—Defines the IP address of the destination device in dotted decimal format.
- baseport* Defines the baseport number for AI296.
- d Deletes an entry from the ARP cache table. The following parameter is accepted:
 - ip_address*—Defines the IP address of the destination device in dotted decimal format.
- s Adds a permanent entry to the ARP cache for the current session. Permanent entries must be in the same subnetwork as the IP address of the destination device. The following parameters are accepted:
 - *ip_address*—Defines the IP address of the destination device in dotted decimal format.
 - *mac_address*—Defines the MAC address of the destination device.

Examples

This example displays all ARP cache entries.

```
[296] arp -a

Internet Address      Ethernet Address      Type      Li fe
172.16.52.16         00-00-92-90-F2-D9    temp      5 mi ns
172.16.2.9           00-40-72-00-7F-96    temp      2 mi ns
[296]
```

Column	Description
Internet Address	Displays the IP address of the destination device.
Ethernet Address	Displays the MAC address of the destination device.
Type	Displays the type of ARP cache entry as <code>perm</code> or <code>temp</code> . Type <code>temp</code> specifies that the entry is temporary and will be deleted when the time interval specified in the <code>Li fe</code> column expires. Type <code>perm</code> specifies that the entry was entered by the user with the <code>-s</code> option. This entry will not expire and can be removed using the <code>-d</code> delete option.  Note: Resetting AI296 clears both permanent and temporary entries.
Li fe	Displays the time interval for which the temporary entry will remain in the ARP cache.

This example displays an ARP cache entry with IP address 10.40.5.20.

```
[296]arp -a 10.40.5.20

Internet Address      Ethernet Address      Type      Li fe
10.40.5.20           00-01-02-EE-A8-30    temp      4 mi ns
[296]
```

This example displays the configuration of an ARP cache entry with IP address 10.40.53.2 and MAC address 08-00-09-4a-c5-5a.

```
[296]arp -s 10.40.53.2 08-00-09-4a-c5-5a
10.40.53.2 mapped to Ethernet address 08-00-09-4A-C5-5A

[296]
```

This example displays the deletion of an ARP cache entry with IP address 10.40.53.2.

```
[296]arp -d 10.40.53.2  
Mapping for 10.40.53.2 deleted  
[296]
```

break

Description

This command terminates an asynchronous or shell connection. Use command [diag-tconn on page 9-49](#) (not command [who on page 9-122](#)) when referencing connections and connection ID numbers.



Note: This command only works for calls connected to the shell.



CAUTION: This command operates without regard to current activity on the serial port.

Command Types

shell and winslc

Formats

For the shell command:

```
break { link_number | connection_origin }
```

```
break -i d id_number
```

For the winslc command:

```
wi nsl c baseport break { link_number | connection_origin }
```

```
wi nsl c baseport break -i d id_number
```

Parameters

<i>connection_origin</i>	Defines the IP address and port number of the device connection being terminated.
<i>baseport</i>	Defines the baseport number for AI296.
<i>id_number</i>	Defines the ID number of the device connection being terminated.
<i>link_number</i>	Defines the link number for the connection being terminated.

Examples

This example displays the termination of a shell connection for a device with IP address 10.40.5.11 and port number 1821.

```
[296]break 10.40.5.11#1821  
Breaking connection: 10.40.5.11#1821  
[296]
```

This example displays the termination of a connection for a device with ID 65.

```
[296]break -id 65  
Breaking connection with ID: 65  
[296]
```

bridge

Description

This command dumps a list of all the addresses in the bridge table or clears the bridge table.

Command Types

shell

Formats

```
bridge { dump | clear }
```

Parameters

`dump` Dumps a list of all the addresses in the bridge table.

`clear` Clears the bridge table.

Examples

This example displays the dumping of the bridge table.

```
[296]bridge dump
Hash table for Bridge Group 0:
  MAC Address      Source Interface
  00:00:92:90:CF:42 Ethernet
  00:00:92:90:CD:42 Ethernet
  00:40:72:00:D2:43 Link 16
  00:60:47:CC:DB:43 Ethernet
  00:00:92:90:CF:44 Ethernet
  00:A0:C9:25:9A:B1 Ethernet
  00:40:72:00:73:B8 Ethernet
  00:40:72:00:41:C7 Ethernet
  00:00:92:90:95:C8 Ethernet
  00:00:92:90:C7:CE Ethernet
  00:10:4B:64:25:CF Ethernet
  00:00:92:90:0C:D0 Ethernet
  00:00:92:9B:58:D3 Ethernet
  00:00:92:B6:3A:D5 Ethernet
  00:00:0E:3A:02:D5 Ethernet
  00:10:83:F5:A5:D8 Ethernet
  00:00:92:90:96:DB Ethernet
  00:00:92:90:95:DF Ethernet
  00:40:72:00:AF:E7 Link 16
```

creset

Description

This command resets the error counters for a link or a range of links. There is no output for this command. To see if the error counters were reset for the links you specified, enter command [stasc on page 9-92](#).

Command Types

shell and winslc

Formats

For the shell command:

```
creset range
```

For the winslc command:

```
wi nsl c baseport creset range
```

Parameters

- range* Defines the link or a range of links being reset. Valid values are:
- A single link number (for example, 3 to reset error counters for link 3)
 - A series of link numbers separated by commas (for example, 1, 2, 3 to reset error counters for links 1, 2, and 3)
 - A range of link numbers separated by a dash (for example, 1-2 to reset error counters for links 1 and 2)
 - Any combination of a single link number, series, and/or range (for example, 1, 2-3 to reset error counters for links 1, 2, and 3)
 - * to reset error counters for all links.

baseport Defines the baseport number for AI296.

Examples

This example displays the resetting of error counters for links 5 to 7.

```
[296]creset 5-7  
[296]
```


date

Description

This command sets and displays the date and the time for AI296 when it is operating in standalone mode.

Command Types

shell

Formats

date

Examples

This example displays the configuration of date 08-04-2005 and time 10: 24: 49 for AI296 in standalone mode.

```
[296]date
Today is Thursday 05-01-2004 01:09:52
Please enter the date and/or time.
Use 'MM-DD-YYYY' and/or 'hh:mm:ss' (24-hour format): 08-04-2004 10:24:49
[296]
```



debug

Description

This command enables or disables the logging of debugging data.



Tip: You have to have logging turned on to view debug information from a shell connection.

Command Type

shell

Formats

```
debug { alias | x25 | pvcfsm | asypvcfsm | nlipvcfsm | tpi fsm |  
modmuxfsm | all fsm | pppfsm | linkChange | bootp | all } { on | off }
```

Parameters

alias	Enables or disables the logging of alias translation debugging data.
x25	Used primarily by Kentrox Technical Support to isolate system faults.
pvcfsm	Used primarily by Kentrox Technical Support to isolate system faults.
asypvcfsm	Used primarily by Kentrox Technical Support to isolate system faults.
nlipvcfsm	Used primarily by Kentrox Technical Support to isolate system faults.
tpi fsm	Used primarily by Kentrox Technical Support to isolate system faults.
modmuxfsm	Used primarily by Kentrox Technical Support to isolate system faults.
all fsm	Used primarily by Kentrox Technical Support to isolate system faults.
pppfsm	Used primarily by Kentrox Technical Support to isolate system faults.
bootp	Enables or disables the logging of bootp attempts so that users can determine if the bootp process is still underway or if it has been completed.
linkChange	Enables or disables the logging of debugging data when the PPP protocol on a link has gone down.
all	Enables or disables the logging of all debugging data.
on	Enables the logging of specified debugging data.
off	Disables the logging of specified debugging data.

Examples

This example displays the enabling of all debug data logging.

```
[296]debug all on
debug alias is on
debug x25 is on
debug pvcfsm is on
debug asypvcfsm is on
debug nlpvcfsm is on
debug tpi fsm is on
debug modmuxfsm is on
debug all fsm is on
debug pppfsm is on
debug linkChange is on
debug ml tfsm is on
debug bootp is on
[296]
```



delete

Description

This command deletes a specified file that resides on AI296.

Command Type

shell

Formats

`del ete fi l ename`

Parameters

fi l ename Defines the name of the file to delete.

Examples

This example displays the deletion of file `log.txt`.

```
[296]del ete log.txt  
Are you sure you want to del ete 'log.txt'? (y/n) y  
log.txt del eted.  
[296]
```

diag-conn

Description

This command displays a list of enabled links along with connection information for each link. Data can be displayed continuously, one page at a time, or sent to the screen one time only for all connections. The default mode is a continuous display.

Command Type

shell

Formats

di ag-conn

Examples

This example displays existing connections across AI296.


```

C O N N E C T I O N S  Mode: Continuous  [Search Inactive]

103. ASY. 1. 1          [ Idle          ]
113. TCP 172.16.2.9#1032 <--Data Transfer--> SHELL

Enter S-ki p, I -nternal , A-II , M-ore, D-etail , F-ind, P-revPg, N-extPg or Q-uit:

```

 **Note:** For explanations of the states shown, such as `idle` and `data transfer`, refer to section [pvclist on page 9-80](#).

Display Item	Description
S-ki p	This option bypasses connections. It gives a prompt for the number of connections to skip.
I -nternal	This option toggles between I -nternal and H-ide Int. I -nternal displays all the internal loopback connections along with other connections.
A-II	This option displays all connections without page breaks. The display does not show duplicate connections. For example, if connection number 15 is connected to 30, the connection from 30 to 15 will not appear.
M-ore	This option toggles between M-ore and L-ess. It displays the link and PVC number for X.25 PVCs, the link and X.121 addresses for X.25 SVCs, and the alias used to make the connection.

Display Item	Description
D-etail	This option prompts for the ID of the connection to view and displays details for that connection.
F-i nd	This option displays specific types of connections. F-i nd indicates text matches that are applied to the display lines. The matching is not case-sensitive. The logic for the matches can be AND or OR. PATTERN 1, LOGIC 2, and PATTERN 3 are evaluated before LOGIC 4 and PATTERN 5 are considered.
P-revPg	This option displays the previous page of connections. Twenty connections per page appear. The numbers that appear in front of the description (for example, 103. and 113.) are relative numbers and do not represent any particular link, port, or PVC. The display does not show duplicate connections. For example, if connection number 15 is connected to 30, the connection from 30 to 15 will not appear.
N-extPg	This option displays the next page of connections. Twenty connections per page appear. The numbers that appear in front of the description (for example, 103. and 113.) are relative numbers and do not represent any particular link, port, or PVC. The display does not show duplicate connections. For example, if connection 15 is connected to 30, the connection from 30 to 15 will not appear.
Q-ui t	This option exits the command display and returns the user to the prompt.

diag-eth

Description

This command monitors and displays Ethernet diagnostic information.

Using Interpretation Mode

There are three levels of diagnostic information:

- **Minimum**—Displays minimal diagnostic information (mostly the packet's source and destination). This is the default interpretation mode setting.
- **Medium**—Displays protocol fields that are likely to change for each packet, as well as those with values that are out of the ordinary.
- **Maximum**—Displays all protocol fields.

To configure interpretation mode:

1. At the prompt, enter **di ag-eth**.
2. Enter **i nterpret m i n i m u m**, **i nterpret m e d i u m**, **i nterpret m a x i m u m**, or **i nterpret**.



Tip: Entering **i nterpret** with no additional parameter toggles interpretation off and on. When interpretation is toggled from off to on, the diagnostic level is set to the minimum level (the default).

Using the Timestamp Option

Timestamps can be configured to appear on the diagnostic display. The timestamp value displays the calendar date and time.

To enable or disable timestamp display:

1. At the prompt, enter **di ag-eth**.
2. Enter **t i m e s t a m p** to toggle between enabling and disabling the display of the timestamp.

Using Promiscuous Mode

Promiscuous mode can be enabled or disabled during Ethernet diagnostic sessions. By disabling promiscuous mode, only packets traveling on the network that are destined for your Ethernet card appear. By enabling promiscuous mode, all the packets traveling on the network appear.

To enable and disable promiscuous mode:

1. At the prompt, enter **di ag-eth**.
2. Enter **p r o m i s c u o u s** to toggle between enabling and disabling promiscuous mode.



Note: Operating AI296 in the promiscuous mode can reduce performance. The default setting is disabled promiscuous mode. AI296 automatically returns to the default setting (promiscuous mode disabled) when the user quits the **di ag-eth** command.

Using the Help Option

To obtain command help:

1. At the prompt, enter **di ag-eth**.
2. Enter **hel p**. The **di ag-eth** help screen appears.

Configuring Filters

While using the **di ag-eth** command, various filters can be defined to display specific or general diagnostic information.



Tip: There is help associated with the **fi l ter** command. To view this help, enter **fi l ter** after you enter **di ag-eth**. The **fi l ter** help screen appears.

Important: If you are connecting to AI296 using Telnet, remember to filter out the traffic associated with the telnet connection. Failure to do so can cause the diagnostic program to become overloaded, which makes AI296 unresponsive.

To configure a filter:

1. At the prompt, enter **di ag-eth**.
2. Enter the desired filter. Refer to section [Formats on page 9-31](#) for information on filter formats.

Capturing Data

While using the **di ag-eth** command, data can be captured for Ethernet diagnostics. All variables and filters can be configured for specific or general information capture.

To configure data capture:

1. Define the following settings:
 - Interpretation Mode
 - Timestamp Mode
 - Promiscuous Mode
 - Data Mode
 - Filters

2. Enter `go`. The system starts capturing data with the user-defined settings and filters.
3. Enter `stop` to stop capturing data.

Exiting the diag-eth Session

To exit the `diag-eth` session, type `quit`. The `[296]` prompt appears.

Command Type

shell

Formats

`diag-eth`

The following formats apply to filters:

```
filter { add | delete } [ src mac_address ] [ dst mac_address ]
filter { add | delete } [ src ip_address ] [ dst ip_address ]
filter { add | delete } [ src ip_address#port_number ]
[ dst ip_address#port_number ]
filter { add | delete } [ src *#port_number ] [ dst *#port_number ]
filter { add | delete } protocol [ ip | tcp | udp | icmp | arp | osi ]
filter { add | delete } all
filter list
```

Parameters

<code>add</code>	Adds a filter.
<code>delete</code>	Deletes a filter.
<code>src</code>	Defines the source address (MAC, IP, or TCP/UDP) for the filter being created.
<code>mac_address</code>	Defines the MAC address to use for either the source or destination of the filter being created.
<code>dst</code>	Defines the destination address (MAC, IP, or TCP/UDP) for the filter being created.
<code>ip_address</code>	Defines the IP address to use for either the source or destination of the filter being created.
<code>ip_address#port_number</code>	Defines the IP address and the TCP/UDP port number for either the source or destination of the filter being created.

<i>*#port_number</i>	Defines the TCP/UDP port number regardless of the MAC/IP address settings.
protocol	Adds or deletes a specific protocol filter. Available protocol filters are: <ul style="list-style-type: none">● ip● tcp● udp● icmp● arp● osi.
all	Deletes all the filters or adds a filter to show all Ethernet traffic.
list	Lists all the filters in the system.

Examples

This example displays the configuration of diagnostic interpretation level `medium` for the Ethernet diagnostic session display.

```
[296]diag-eth
interpret medium
Interpretation is now set to MEDIUM.
```

This example displays the enabling and disabling of the timestamp display.

```
[296]diag-eth
timestamp
Timestamps will now be displayed.
timestamp
Timestamps will no longer be displayed.
```

This example displays the enabling and disabling of promiscuous mode.

```
[296]diag-eth
promiscuous
The ethernet chip is now in promiscuous mode.
promiscuous
The ethernet chip is now in normal mode.
```

This example displays Ethernet diagnostic help information.

```
[296]diag-eth
help
Commands for diag-eth:
  interpret  Turn on data interpretation.
  quit      Exit diag-eth.
  help      Display this help text.
  data      Toggle uninterpreted data display.
  timestamp Toggle data timestamping.
  go        Begin data capturing.
  stop      Terminate data capturing.
  filter    Add a data filter.
  promiscuous Toggle promiscuous mode for the ethernet chip.
```

This example displays the help associated with the Ethernet diagnostic `filter` command.

```
[296]diag-eth
filter
Usage: FILTER <ADD|DELETE> [SRC <mac>] [DST <mac>]
      FILTER <ADD|DELETE> [SRC <i pAddr>] [DST <i pAddr>]
      FILTER <ADD|DELETE> [SRC <i pAddr#port>] [DST <i pAddr#port>]
      FILTER <ADD|DELETE> [SRC <*#port>] [DST <*#port>]
      FILTER <ADD|DELETE> PROTOCOL <IP|TCP|UDP|ICMP|ARP|OSI>
      FILTER <ADD|DELETE> ALL
      FILTER LIST

Where:
  <mac>      is the MAC address desired, with the format
             XX:XX:XX:XX:XX:XX, with each 'X' representing
             a hexadecimal digit.
  <i pAddr>  is the desired IP address, with the format
             X.X.X.X, where 0 < X < 256.
  <port>     is the desired TCP port.
```

This example displays the diagnostic Ethernet display when the following parameters are entered:

- `interpret max` to set maximum interpretation
- `timestamp` to enable timestamping
- `promiscuous` to enable promiscuous mode
- `filter add src 172.16.2.9` to add a filter for address 172.16.2.9
- `data` to display data
- `go` to start the data capture
- `stop` to stop capturing data.

```
[296]diag-eth
interpret max
Interpretation is now set to MAXIMUM.
timestamp
Timestamps will now be displayed.
promiscuous
The ethernet chip is now in promiscuous mode.
filter add src 172.16.2.9
New filter added.
data
Uninterpreted data will now be displayed.
go
-----
Timestamp: 11-10-2006 02:33:54.74
<- Ethernet: [ 00:40:72:00:7F:96 ] -> [ 00:00:0C:7E:F2:72 ]
          Protocol [ 0x0800:IP ]

  IP:      [ 172.16.2.9 ] -> [ 172.16.0.1 ]
          Version [ 4 ]
          Header Length [ 20 bytes ]
          Type-Of-Service [ none ]
          Identifier [ 37903 ]
          Fragmentation Flags [ none ] Offset [ 0 bytes ]
          Time-To-Live [ 60 hops ]
          Protocol [ 0x01:ICMP ]

  ICMP:    Type [ 8 ] Code [ 0 ]
          (echo request)

00 00 48 44 41 42 43 44 45 46 47 48 49 4A 4B 4C    .. HDABCDEFGH IJKL
4D 4E 4F 50 51 52 53 54 55 56 57 58 59 5A 41 42    MNOPQRSTUVWXYZAB
43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52    CDEFGHI JKLMNOPQR
53 54 55 56 57 58 59 5A 41 42 43 44 45 46 47 48    STUVWXYZABCDEFGHIJ
49 4A 4B 4C                                         IJKL
-----
stop
```

This example displays the diagnostic Ethernet display when the following is entered:

- filter add src 00:40:72:00:d2:d9 to configure a filter with source MAC address 00:40:72:00:d2:d9
- filter add dst 00:40:72:00:d2:d9 to configure a filter with destination MAC address 00:40:72:00:d2:d9
- go to start the capture
- stop to end the capture.

```
[296]diag-eth
filter add src 00:40:72:00:d2:d9
New filter added.
filter add dst 00:40:72:00:d2:d9
New filter added.
go
-----
<- 01 80 C2 00 00 00 00 40 72 00 D2 D9 00 26 42 42      .....@r....&BB
    03 00 00 00 00 81 00 20 00 40 72 00 D2 D9 00 00      .....@r....
    00 00 00 20 00 40 72 00 D2 D9 80 65 00 00 07 00      .....@r....e....
    09 00 0F 00 00 00 00 00 00 00 00 00 00 00 00      .....
-----
<- 00 40 72 00 D2 D9 00 40 72 00 7F 96 08 00 45 00      .@r....@r....E.
    00 29 0F 81 00 00 3C 06 F4 8A AC 10 02 09 AC 10      .)....<.....
    20 9A 04 16 00 17 75 87 E4 2F 30 E0 B6 B4 50 10      .....u../O...P.
    08 00 A6 96 00 00 41 0D 01 B4 6D 74 01 B4 FF FC      .....A...mt....
-----
<- stop
```

This example displays the diagnostic Ethernet display when the following is entered:

- filter add protocol tcp to configure a filter with a defined TCP protocol
- go to start the capture
- stop to end the capture.

```
[296]diag-eth
filter add protocol tcp
New filter added.
go
-----
<- 00 A0 C9 22 D8 C4 00 00 92 B6 2F 97 08 00 45 2C      ..."/...E,
    00 6C CF B7 40 00 80 06 69 4B AC 10 37 14 AC 10      .I..@...iK..7...
    32 28 10 9A 00 8B 01 67 55 24 00 D0 5D 81 50 18      2(...gU$...].P.
    1E 59 5C 61 00 00 00 00 00 40 FF 53 4D 42 2B 00      .Y\a....@.SMB+.
    00 00 00 18 03 80 00 00 00 00 00 00 00 00 00 00      .....
    00 00 07 08 FE CA 02 10 41 0F 01 01 00 1B 00 4C      .....A.....L
    57 4F 20 43 57 20 56 4C 4F 20 44 45 4F 20 4D 41      WO CW VLO DEO MA
    57 20 4C 4D 57 20 41 52 57 00                        W LMW ARW.
-----
stop
```

This example displays the diagnostic Ethernet display when `filter list` is entered to display all filters.

```
[296]diag-eth
filter list
Filters currently being used by diag-eth:
  protocol tcp
  dst 00:40:72:00:d2:d9
  src 00:40:72:00:d2:d9
  dst 172.16.2.9
  src 172.16.2.9
  protocol tcp
```

This example displays the deletion of filter `protocol tcp`.

```
[296]diag-eth
filter delete protocol tcp
Filter 'protocol tcp' has been deleted.
```

This example displays the deletion of all filters.

```
[296]diag-eth
filter delete all
Filter 'dst 00:40:72:00:d2:d9' has been deleted.
Filter 'src 00:40:72:00:d2:d9' has been deleted.
Filter 'dst 172.16.2.9' has been deleted.
Filter 'src 172.16.2.9' has been deleted.
```

diag-info

Description

This command displays diagnostic information for WAN, asynchronous, Ethernet, and TCP connections as well as for memory. Different screens of information can be viewed depending on the command option that is entered. The screens display the state of serial links and system updates once per second. The available display options are `w`, `m`, `a`, `e`, and `t`. They display the following information:

- Option `w` displays WAN diagnostic information. `w` is the default display.
- Option `m` displays the STREAMS allocation and memory information.
- Option `a` displays asynchronous information.
- Option `e` displays Ethernet information.
- Option `t` displays TCP data.



Note: Type `X` to exit the command display.

Command Type

shell

Formats

`di ag-i nfo`

Examples

This example displays the WAN Diag Info screen, which is accessed by typing `w`.

W A N D I A G I N F O						
LI NK	STATE	TX_PEND	RX_WANT	NO_BUF	BYTE_I N	BYTE_OUT
1	30	0	1	0	0	759050
2	0	0	1	0	0	0
3	0	0	1	0	0	0
4	0	0	1	0	0	0
5	0	0	1	0	0	0
6	0	0	1	0	0	0
7	0	0	1	0	0	0
8	0	0	1	0	0	0
9	0	0	1	0	0	0
10	0	0	1	0	0	0
11	0	0	1	0	0	0
12	0	0	1	0	0	0
13	0	0	1	0	0	0
14	0	0	1	0	0	0
15	0	0	1	0	0	0
16	0	0	1	0	0	0

Enter W-an, M-emory, A-sync, E-thernet, T-cp or Q-uit:

Column	Description
LI NK	Displays the link number.
STATE	Displays the state of the WAN driver. Two states are available: <ul style="list-style-type: none"> • 0 means the X.25 frame level is not established. • 30 means the X.25 frame level is established.
TX_PEND	Displays the state of the transaction if one is pending for transmission.
RX_WANT	Displays the state of the buffer if another buffer is needed.
NO_BUF	Displays the number of times the receiver cannot be started because no buffers were available.
BYTE_I N	Displays the count of the number of bytes coming in.
BYTE_OUT	Displays the count of the number of bytes going out.

This example displays diagnostic information for STREAMS allocation and memory, which are accessed by typing `m`.

S T R E A M S A L L O C A T I O N						
NAME	FREE	ALLOC	%FREE	USED	FAIL	HWM
Queues	8361	239	97	1073	0	241
Streams	2085	115	94	532	0	116
Bufcalls	64	0	100	0	0	0
Timeouts	2387	13	99	402908	0	45
Message blocks	16015	369	97	588495	0	551
Data blocks:						
Class 0	1519	17	98	7954	0	40
Class 1	4080	16	99	835	0	18
Class 2	14944	56	99	301866	0	64
Class 3	9981	19	99	11034	0	32
Class 4	500	0	100	0	0	0
Class 5	390	260	60	222746	0	263
Class 6	1	1	50	1	0	1
Extended	350	0	100	0	0	0
S Y S T E M A L L O C A T I O N (alloc failed=0)						
REGION:	ASIZ	CNT	CNT_HWM	USED	USED_HWM	UNIT_SIZE
AI 1	741664	324	424	17632	20704	32
AI 2	741664	0	0	0	0	32
AI 3	741664	32	36	179296	180832	32
Enter M-emory, A-sync, E-thernet, T-cp or Q-uit:						

Column	Description
NAME	Displays the name of the STREAMS resource.
FREE	Displays the number of free or available STREAMS resources.
ALLOC	Displays the number of STREAMS resources allocated at the time of the display.
%FREE	Displays the percent of free or available STREAMS resources.
USED	Displays the number of STREAMS resources used since the card was last rebooted.
FAIL	Displays the number of times an allocation failed.
HWM	Displays the highest number of resources ever allocated at one time.
REGION	Displays the memory allocation regions.
ASIZ	Displays the size of the memory allocation regions in bytes.
CNT	Displays the number of blocks allocated from a region (regardless of size).
CNT_HWM	Displays the highest number of blocks allocated since the card was last rebooted.
USED	Displays the number of bytes currently allocated from a region.

Column	Description
USED_HWM	Displays the highest number of bytes allocated since the card was last rebooted.
UNIT_SIZE	Displays the size in bytes of the memory units that can be allocated.

This example displays diagnostic information for asynchronous connections, which is accessed by typing A.

```

ASYNC DIAG INFO
LINK STATE BYTES_IN BYTES_OUT LINK STATE BYTES_IN BYTES_OUT
 1 1 0 0 16 0 0 0
 2 1 0 0 17 0 0 0
 3 1 0 0 18 0 0 0
 4 0 0 0 19 0 0 0
 5 0 0 0 20 0 0 0
 6 0 0 0 21 0 0 0
 7 0 0 0 22 0 0 0
 8 0 0 0 23 0 0 0
 9 0 0 0 24 0 0 0
10 0 0 0 25 0 0 0
11 0 0 0 26 0 0 0
12 0 0 0 27 0 0 0
13 0 0 0 28 0 0 0
14 0 0 0 29 0 0 0
15 0 0 0 30 0 0 0
16 0 0 0 31 0 0 0
17 0 0 0 32 0 0 0
Enter M-emory, A-sync, E-thernet, T-cp or Q-uit:
  
```

Column	Description
LINK	Displays the link number.
STATE	Displays the state of the driver. Two states are available: <ul style="list-style-type: none"> 0 specifies that the link is not established. 1 specifies that the link is enabled. The link does not have to have a connection to be enabled.
BYTE_IN	Displays the number of bytes coming into the link.
BYTE_OUT	Displays the number of bytes going out of the link.

This example displays diagnostic information for the front panel Ethernet interface, which is accessed by typing E.

```

ETHERNET 0
Rx LG frame length violation: ---0
Rx NO nonoctet aligned frame: ---0
Rx SH short frame (runt): -----0
Rx CR CRC error: -----0
Rx OV overrun: -----0
Rx CL collision: -----0
Rx BSY buffers exhausted: -----0
Rx frames missed: -----0
Rx frames received: -----0
Rx bytes received: -----0

Tx RL retry limit exceeded: -----0
Tx RC collisions: -----0
Tx UN underruns: -----0
Tx LC late collisions: -----0
Tx CSL carrier sense lost: -----2451095
Tx queued buffers: -----0
Tx frames sent: -----2451095
Tx bytes sent: -----233814304
Unexpected interrupts: -----0
Enter M-emory, A-sync, E-thernet, T-cp or Q-uit:

```

Display Item	Description
Rx LG frame length violation	Displays the number of frame length violations in received packets.
Rx NO nonoctet aligned frame	Displays the number of misaligned, received frames.
Rx SH short frame (runt)	Displays the number of short received frames.
Rx CR CRC error	Displays the number of packets received that have had CRC errors.
Rx OV overrun	Displays the number of packets not received by the interface because of a receiver overrun.
Rx CL collision	Displays the transmit collisions on received frames. This is the number of times the Ethernet device goes to transmit but cannot because someone else is already transmitting.
Rx BSY buffers exhausted	Displays the number of times all receive buffers were used, but more were required.
Rx frames missed	Displays the number of frames that were supposed to be received, but were missed.



Display Item	Description
Rx frames received	Displays the number of frames received on the connection.
Rx bytes received	Displays the number of bytes received on the connection.
Tx RL retry limit exceeded	Displays the number of times transmitted frames exceeded the retry limit.
Tx RC collisions	Displays the number of transmit collisions. This is the number of times the Ethernet device goes to transmit but cannot because someone else is already transmitting.
Tx UN underruns	This displays the number of times the transmitter has run out of data due to the system being busy.
Tx LC late collisions	Displays the number of late collisions on transmitted frames.
Tx CSL carrier sense lost	Displays the number of times that the carrier sense was lost.
Tx queued buffers	Displays the number of queued buffers.
Tx frames sent	Displays the number of frames that were transmitted.
Tx bytes sent	Displays the number of bytes that were transmitted.
Unexpected interrupts	Displays the number of times that the transfer of frames was unexpectedly interrupted.

This example displays diagnostic information for the Ethernet sonic chip in use on this card (SONIC0), which is accessed by typing E.

```

SONIC0
frames_received      2133706      2451073
bytes_received      204088549    233809600
frames_sent          317511
bytes_sent           38293966     0
collisions           116          0
transmit_errors      0            0
crc_errors           0            0
alignment_errors     0            0
missed_packets       0            0
rx_buffers_exhausted 0            0
heartbeatlost        0            0
rx_overruns          0            0
rba_exceeded         0            0
current_tda          8
ex_defers            0            0
ex_coll              0            0
tx_underruns         0            0
bad_tx_size          0            0
tx_blocked           0            2451086
tx_delayed           0            0
state                2            2451086
eth_intr_stuck: 0-----233812081

```

Display Item	Description
frames_received	Displays the number of frames received on the connection.
bytes_received	Displays the number of bytes received on the connection.  Note: This field displays a negative number after it reaches a count of 2,147,483,647. This is normal operation and does not indicate an error.
frames_sent	Displays the number of frames sent from the connection.
bytes_sent	Displays the number of bytes sent from the connection.  Note: This field displays a negative number after it reaches a count of 2,147,483,647. This is normal operation and does not indicate an error.
collisions	Displays the number of transmit collisions. This is the number of times the Ethernet device goes to transmit but cannot because someone else is already transmitting.
transmit_errors	Displays the number of transmit errors that have occurred.

Display Item	Description
crc_errors	Displays the number of packets received that have had CRC errors.
alignment_errors	Displays the number of alignment errors.
missed_packets	Displays the number of missed packets.
rx_buffers_exhausted	Displays the number of times all receive buffers were used, but more were required.
heartbeatlost	Displays if there is an error between the Ethernet interface and the Ethernet transceiver.
rx_overruns	Displays the number of packets not received by the interface because of a receiver overrun.
rba_exceeded	Displays the number of times that the maximum number of receive buffers have been exceeded.
current_tda	Displays the current data area being transmitted.
ex_defers	Displays the number of times that the maximum limit on the excessive deferral timer is exceeded. An excessive deferral error is recorded when the following events occur: <ul style="list-style-type: none"> • A transmission attempt is made while another node is transmitting. • The transmit period is longer than the excessive deferral timer limit.
ex_coll	Displays the number of times an excessive collision has been recorded. An excessive collision is recorded when a transmit attempt occurs 16 times and a collision occurs each time.
tx_underruns	Displays the number of times the transmitter has run out of data due to the system being busy.
bad_tx_size	Displays the number of times the transmit byte count was incorrect.
tx_blocked	Displays a 1 if the transmitter is blocked. Otherwise, a 0 is displayed.
tx_delayed	Displays the number of times the transmitter has been blocked.

Display Item	Description
state	Displays the current state of the Ethernet interface. The following values may appear: <ul style="list-style-type: none"> ● 0—The Ethernet interface is uninitialized. ● 1—The Ethernet interface is idle. ● 2—The Ethernet interface is active. ● 3—The Ethernet interface needs to be reset.
eth intr stuck	Displays the number of times the Ethernet interface interrupt has stuck while servicing the interrupt.

This example displays diagnostic information for TCP data, which is accessed by typing `T`.

```

      T C P / I P   I N F O
Copied ethernet receive packet:    0
TCP keepalive failed:              0
TCP max keepalive tries:           1
Dropped SNMP request:              0

Enter M-emory, A-sync, E-thernet, T-cp or Q-uit:

```

Display Item	Description
Copied ethernet receive packet:	Displays the number of copied Ethernet receive packets.
TCP keepalive failed:	Displays the number of TCP keep-alive messages that have been sent and were expected to be received, but were not received.
TCP max keepalive tries:	Displays the maximum number of TCP keep-alive messages received on the connection.
Dropped SNMP request:	Displays the number of dropped SNMP requests.

diag-line

Description

This command monitors incoming and outgoing asynchronous traffic and displays diagnostic information for the traffic. A help screen provides a list of commands available for line monitoring diagnostics.



CAUTION: The line monitor degrades the performance of AI296. Do not use this command in heavy traffic situations in which performance is crucial.



Note: Information from the line monitor diagnostic mode only appears when data is passed on serial links. If no data is passed, the screen is blank.

[Table 9-2](#) displays the line monitor mode options that can be entered after `diag-line` is entered.

Table 9-2 Line Monitor Mode Options

Option	Function
data	Toggles the display of data on or off.
modem	Toggles the display of modem signals on or off.
t	Toggles the display of a timestamp for each frame of data displayed on or off.
h or r	Hides (h) or reveals (r) all lines on AI296.
h l x or r l x	Hides (h) or reveals (r) a specified line (x).
r l x y	Reveals a specified LCN (y) on a specified line (x).
r l x y z	Reveals a range of specified LCNs (y through z) on a specified line (x).
h l x y- or r l x y-	Hides or reveals all LCNs from a specified LCN (y) on up on a specified line (x).
h l x -y or r l x -y	Hides or reveals all LCNs from 0 to a specified LCN (y) on a specified line (x).
filterL2	Toggles the filtering of level 2 frames without packet information on or off.

Table 9-2 Line Monitor Mode Options (Continued)

Option	Function
<code>interpret [a x]</code>	<p>Toggles the display of decoded packet data on the line monitor on or off and optionally selects the format of the data in the data portion of the packet (a or x).</p> <ul style="list-style-type: none"> • a displays the data in the data portion of the packet in ASCII/hexadecimal format. Unprintable data (hexadecimal values 0x00 to 0x20 and 0x7F to 0xFF) appears as two digit hexadecimal numbers separated by a space. Printable data appears as printable characters. This option only applies to data. • x displays all the data in the data portion of the packet in hexadecimal format. All data appears as two-digit hexadecimal numbers separated by a space. This option only applies to data.
<code>print</code>	Prints the range of revealed LCNs for all lines.
<code>CTRL+s</code>	Pauses the line monitor.
<code>go</code> or <code>CTRL+q</code>	Reactivates the line monitor after displaying the line monitor options.
<code>ESC</code> or <code>q</code>	Quits monitoring traffic, exits from the line monitor, and returns to the prompt.
<code>?</code>	Displays a list of the options available for line monitoring diagnostics.



Tip: Press ENTER to execute a command and press ESC to end the diagnostic session.



CAUTION: If you are connected to AI296 through a serial port, do not monitor the port with command `diag-line`. Use command `hide` to hide and not monitor the port. Failure to comply with this statement can cause AI296 to become unresponsive.

Command Type

shell

Formats

`diag-line`

Examples

This example displays a typical default line monitor display for asynchronous data.

```

06>d FF 03 00 31 00 01 FF FF FF FF FF FF 00 00 92 9B ... 1.....
    59 0C 08 06 00 01 08 00 06 04 00 01 00 00 92 9B Y.....
    59 0C AC 10 32 05 00 00 00 00 00 00 AC 10 22 79 Y... 2....."y
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
    00 00 ..
06<d FF 03 02 01 00 00 00 00 00 80 00 00 40 72 00 6F .....@r.o
    77 00 00 00 00 80 00 00 40 72 00 6F 77 80 04 00 w.....@r.ow...
    00 14 00 02 00 0F 00 .....
06>d FF 03 00 31 00 01 FF FF FF FF FF FF 00 10 4B D0 ... 1..... K.
    D3 5D 08 06 00 01 08 00 06 04 00 01 00 10 4B D0 .]..... K.
    D3 5D AC 10 33 D1 00 00 00 00 00 00 AC 10 20 EB .]... 3.....
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
    00 00 ..
06>d FF 03 00 31 00 01 FF FF FF FF FF FF 00 10 4B D0 ... 1..... K.
    D3 5D 08 06 00 01 08 00 06 04 00 01 00 10 4B D0 .]..... K.
    D3 5D AC 10 33 D1 00 00 00 00 00 00 AC 10 1E 82 .]... 3.....
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
    00 00 ..
  
```

Column	Description
Line number	Displays the line number, which can range from 01 to 32.
Direction indicator	Displays the direction indicator for the line. One of the following appears: <ul style="list-style-type: none"> • > for transmitted frames • < for received frames.
Frame type indicator	Displays the frame type indicator for the line. One of the following appears: <ul style="list-style-type: none"> • d for asynchronous links • Blank for other frames or packets.
Data	If the data field byte count is disabled, it gets displayed as ct: <# of bytes in data field>. If the data display is enabled and only present in data packets, then the data byte count is displayed as <ASCII STRING>.

diag-tconn

Description

This command displays a list of enabled links along with connection information for each link. It displays all connections on AI296 in the same format as command [diag-tconn on page 9-27](#), but it is not interactive.

Command Types

shell and winslc

Formats

For the shell command:

```
di ag-tconn
```

For the winslc command:

```
wi nsl c baseport di ag-tconn
```

Parameters

baseport Defines the baseport number for AI296.


Examples

This example displays active connections on AI296. This is a partial display. The rest of the response follows the pattern below for the remaining connections.

```
[296] di ag-tconn
TI DMUXsw#1
13: 26: 30 040900 Sev=F Base=032 Msg:
AI 232 Complete Connections Dump:

  1. PARENT2                               <-----> 32. ASY. 2. 1
  3. TCP 172. 16. 31. 45#5001               <-----> PARENT2. 1
      TID(s):  SONEPLEX-NE3                 SONEPLEX-NE4

 15. TCP 192. 168. 31. 15#5001             <-----> PARENT2. 2
      TID(s):  NE4-DAYTON-OH                NE5-DAYTON-OH  NE6-DAYTON-OH
              NE7-DAYTON-OH                NE8-DAYTON-OH  NE9-DAYTON-OH
[296]
```

 **Note:** The connection ID is the first number that appears for each connection. For example, the connection ID for connection PARENT2 is 1.



dir

Description

This command displays a list of files with associated times, dates, permissions, and sizes.

Command Type

shell

Formats

```
dir [-l ]
```

Parameters

- l Displays a list of the available files and file information such as permission, time, date, and file size. The `ls` command with this option is the same as the `dir` command.

Examples

This example displays all available files.

```
[296]dir  
boot.ini  
boot.img  
232.img  
log.txt  
primary.cnf  
[296]
```

This example displays all available files with permission, size, time, and date information.

```
[296]dir -l  
-rw-r--r-- 1 0 0 143 Jun 1 22:52 boot.ini  
-r--r--r-- 1 0 0 2175720 Aug 15 09:54 boot.img  
-rw-r--r-- 1 0 0 22061 Jun 1 00:00 log.txt  
-rw-r--r-- 1 0 0 4342 Aug 15 08:21 core.txt  
-rw-r--r-- 1 0 0 7092 Jun 13 22:46 primary.cnf  
[296]
```

exit

Description

This command ends the current shell session and returns to the login prompt.

Command Type

shell

Formats

exit

Examples

This example displays an exit from the current shell session.

```
[296]exit  
  
Writing Configuration ...  
Goodbye.  
  
Valid destinations are as follows:  
  
AI  
  
Enter destination name (or "EXIT" to logout):  
>
```



head

Description

This command displays the first few lines of a file.

Command Type

shell

Formats

`head [-n lines] file_name ...`

Parameters

`[-n lines]` Defines the number of lines to display. The default is 20.

`file_name` Defines the name of the file to display.



Note: Several filenames can be entered with this command.

Examples

This example displays the first 30 lines of file `core.txt`.

```
[296]head -n 30 core.txt
296 crash dump at 14:16:30, 07-20-2004 (up 0 days 00:31:46):
Version 96HPC960.000007 created on 2004-03-29 at 09:43:35

Crash Code= 00000ad
PC= 00000000   SP= 00000000   IMMR= 00000000   MSR= 00000000
GPR00= 00000000   GPR01= 00000000   GPR02= 00000000
GPR03= 00000000   GPR04= 00000000   GPR05= 00000000
GPR06= 00000000   GPR07= 00000000   GPR08= 00000000
GPR09= 00000000   GPR10= 00000000   GPR11= 00000000
GPR12= 00000000   GPR13= 00000000   GPR14= 00000000
GPR15= 00000000   GPR16= 00000000   GPR17= 00000000
GPR18= 00000000   GPR19= 00000000   GPR20= 00000000
GPR21= 00000000   GPR22= 00000000   GPR23= 00000000
GPR24= 00000000   GPR25= 00000000   GPR26= 00000000
GPR27= 00000000   GPR28= 00000000   GPR29= 00000000
GPR30= 00000000   GPR31= 00000000
CR= 00000000   SSR0= 00000000   SSR1= 00000000
LR= 00000000   XER= 00000000   CTR= 00000000
PVR= 00500000   PSOS1= 00000000   PSOS2= 00000000   PSOS3= 00000000
Stack dump:
200082c0: 9421 ffc8 7c08 02a6 bea1 000c 9001 003c
200082d0: 7c7f 1b78 3ae0 0000 4800 1419 7c76 1b78
200082e0: 56d6 001e 3b16 3e82 a338 0000 572c 043e
200082f0: 7d96 6214 3bcc 2004 82be 0000 7ebd ab78
20008300: 7fe3 fb78 4801 76bd 7c7c 1b78 578a 043e
20008310: 2c0a 0100 4081 0008 3b80 0100 3b60 0000
20008320: 576c 043e 578b 043e 7c0c 5800 4080 001c
[296]
```

help

Description

This command lists all available system commands or information for a specific command.

Command Types

shell and winslc

Formats

For the shell command:

```
hel p [ command ]
```

For the winslc command:

```
wi nsl c baseport hel p [ command ]
```

Parameters

baseport Defines the baseport number for AI296.

command Defines the name of the command for which specific information will be displayed.

Examples

This example displays a list of all available commands.

```
[296]hel p
The fol lowi ng commands are avai labl e:
*ftpl ogi n      di ag-tconn    more           stasl c
*tel netl ogi n  di r           pad            syncfl ash
al arm          exi t         passwd        tai l
arp             head          pi ng         tcpoutconn
break          hel p        pppstatus     tftp
bri dge        i d          profi le      tftpboot
creset         ip           pvcedi t     trace
debug         li nk        pvcli st     type
del ete        li nkstat    reset         useradd
di ag-conn     log          shol og      userdel
di ag-eth     logout       show         users
di ag-i nfo    l s         staei a      who
di ag-l i ne   menu        standal one  xvc
[296]
```

This example displays help information for command `show`.

```
[296]hel p show
Usage: show [perf | comments | conn | data | mem | tcp | wan | tconn |
          pvc | eth | ip | router | version | log | crash | inventory |
          ports]
[296]
```


id

Description

This command displays the current user name and profile.

Command Type

shell

Formats

id

Examples

This example displays the current user name and profile.

```
[296]id
Username: 'pubs'
Profile: 'supervisor'
[296]
```



ip

Description

This command displays the following system settings:

- IP address
- Subnet mask
- High IP address
- Primary router IP address
- Backup router IP address

Command Type

shell

Formats

ip

Examples


This example displays the configured IP address information.

```
[296]ip
IP Address          Subnet Mask        Hi gh IP Address
-----
010.040.057.015    255.255.000.000    010.040.057.015

Router IP Address
-----
010.040.000.001 (Default)
No backup router

[296]
```


ip init

 **Note:** This command is only valid when AI296 is in standalone mode.

Description

This command configures the following settings for AI296 in standalone mode:

- IP address
- Subnet mask
- High IP address
- Primary gateway address
- Backup gateway address
- IP address range

 **CAUTION:** The following message appears when the “ip init” command is invoked and no login ports are configured:

There are no login ports currently configured for this system. Please take necessary precautions to prevent lockout.

Command Type

shell

Formats

`ip init`

Examples

This example displays the prompt that appears when `ip init` is entered. A prompt appears for each configurable IP address item.

```
[296] ip init
Enter IP Address (xxx.xxx.xxx.xxx):
```

This example displays the configuration of all the IP settings available with this command:

```
[296] ip init
Enter IP Address (xxx.xxx.xxx.xxx): 172.16.2.39
Setting IP Address to 172.16.2.39
Enter Subnet Mask (xxx.xxx.xxx.xxx): 255.255.000.000
Setting Subnet Mask to 255.255.000.000
Enter Router Address (xxx.xxx.xxx.xxx): 172.16.000.1
Setting Router Address to 172.16.000.1
Enter Backup Router Address (default none): 172.16.2.41
Setting Backup Router Address to 172.16.2.41
Enter IP Address Range (default 1):
Setting range to 1
[296]
```

link

Description

This command is used to:

- Force a serial link to connect or disconnect



Note: When this command is used to disconnect a serial link, all calls are torn down. The serial link does not come back online until command `link start` is issued.

Important: If you are connected to the AI296 shell using a serial port, remember not to disable that port or else loss of connectivity will result.

- Restart a link, which is a stop followed by a start
- Show a configuration summary for a link or range of links.

Command Types

shell and winslc

Formats

For the shell command:

```
link { link_range | * } { restart | start | stop }
```

For the winslc command:

```
winslc baseport link { link_range | * } { start | stop | restart }
```

Parameters

- | | |
|-------------------------|---|
| <code>*</code> | Specifies all links. |
| <code>baseport</code> | Defines the baseport number for AI296. |
| <code>link_range</code> | Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, <code>1, 4-6</code> specifies links 1, 4, 5, and 6. |



Note: This parameter applies to any action the user is trying perform (start, stop, restart, or show information).

- | | |
|----------------------|----------------------------|
| <code>restart</code> | Restarts the serial links. |
| <code>start</code> | Enables the serial links. |
| <code>stop</code> | Disables the serial links. |

Examples

This example displays the starting of links 1 through 4 and 6.

```
[296]link 1-4, 6 start  
[296]
```

This example displays the stopping of links 6 and 8.

```
[296]link 6, 8 stop  
[296]
```

linkstat

Description

This command displays link statistic information.

Command Types

shell and winslc

Formats

For the AI296 system command:

```
l i nkstat
```

For the winslc command:

```
w i nsl c baseport l i nkstat
```

Parameters

baseport Indicates the baseport number of AI296.

Examples

This example displays the link statistic information for AI296.

```
[296]linkstat
```

Link N	E /CRC	D Rx/Abt	R Tx/Ovr	C Rx/Und	D Tx/Und	F Speed	P Conn	Rx/Pkt	Rx/Bytes	Tx/Pkt	Tx/Bytes	Rx
	A	R	S	S	D	M	T					
1:	+Asy	+	+	-	-	9600, n, 8, 1	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
2:	+DCE	+	+	-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
3:	+DCE	+	+	-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
4:	+DCE	+	+	-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
5:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
6:	+DCE	+	+	-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
7:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
8:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
9:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
10:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
11:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
12:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
13:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
14:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
15:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						
16:	-DCE			-	-	9600	0	0	0	0	0	0
0	0	0	0	0	0	RS-232						

```
[296]
```


This example displays link statistic information for the device at baseport 64.

```

AI 198AI Switch Shell Connection 22
>winsl c 64 linkstat
AI 198AI Switch Shell Connection 22
>@AI 19815: 40: 40 072204 Sev=F Base=064 Msg:

      E      D R C D F P
Link N  T T T C R K Speed  Conn  Rx/Pkt  Rx/Bytes  Tx/Pkt  Tx/Bytes Rx
/CRC Rx/Abt Rx/Ovr Tx/Und Intf
      A      R S S D M T
1:  +Asy  + + - -      9600,n,8,1 0      0      0      0      0
   0      0      0      0 RS-232
2:  +DCE  + + - - - -      9600      0      0      0      0
   0      0      0      0 RS-232
3:  +DCE  + + - - - -      9600      0      0      0      0
   0      0      0      0 RS-232
4:  +DCE  + + - - - -      9600      0      0      0      0
   0      0      0      0 RS-232


5:  -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
6:  +DCE  + + - - - -      9600      0      0      0      0
   0      0      0      0 RS-232
7:  -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
8:  -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232

9:  -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
10: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
11: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232

@AI 19815: 40: 41 072204 Sev=F Base=064 Msg:
12: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232

13: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
14: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
15: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232
16: -DCE      - - -      9600      0      0      0      0
   0      0      0      0 RS-232

```

 **Note:** The example has the terminal option set to 80 columns. Setting the terminal to 132 columns is recommended.



log

Description

This command turns the display of log messages on or off.

Command Type

shell

Formats

```
log { on | off }
```

Parameters

`on` Specifies the option that turns the display of log messages on.

`off` Specifies the option that turns the display of log messages off.

Examples

This example displays the current status of the log message display.

```
[296]log
Display of log messages is currently disabled.
[296]
```

This example displays the activation of the log message display.

```
[296]log on
Display of log messages is now enabled.
[296]
```

This example displays the deactivation of log message display.

```
[296]log off
Display of log messages is now disabled.
[296]
```

logout

Description

This command closes a shell session.

Command Type

shell

Formats

l ogout

Examples

This example displays the closing of a shell session.

```
[296]l ogout  
  
Wri ting Confi gurati on . . .  
Goodbye.  
  
** Di sconnecti ng **
```



ls

Description

This command displays a list of available files.

Command Type

shell

Formats

```
ls [ -l ]
```

Parameters

- l Displays a list of the available files and file information such as permission, time, date, and size.



Note: Entering `ls` with this option is the same as entering `dir`.

Examples

This example displays all available files.

```
[296]ls
boot.ini
boot.img
log.txt
core.txt
primary.cnf
[296]
```

This example displays all available files with associated permission levels, times, dates, and sizes.

```
[296]ls -l
-rw-r--r--  1 0      0          143 Jun  1 22:52 boot.ini
-r--r--r--  1 0      0      2175720 Aug 15 10:05 boot.img
-rw-r--r--  1 0      0      22061 Jun  1 00:00 log.txt
-rw-r--r--  1 0      0      4342 Aug 15 08:21 core.txt
-rw-r--r--  1 0      0      7092 Jun 13 22:46 primary.cnf
[296]
```

menu

Description

This command accesses the AI296 main menu system.

Command Type

shell

Formats

menu

Examples

This example displays the AI296 Main Menu.

```
AI 296 Mai n Menu

+ Link Menu
+ System Menu
+ IP Over X. 25 Subnet Menu
+ Static Route Menu

.....
:
:   Select the desired menu option using the UP or DOWN arrow key.
:   Then press ENTER or RETURN to continue.
:
:.....
<F1> Hel p                <F4> Cl ose
```



CAUTION: The following message appears in the shell when the user exits the main menu and has the last login port disabled:

There are no login ports currently configured for this system. Please take necessary precautions to prevent lockout.

This message is only seen when the system is running in standalone mode.



more

Description

This command prints the content of a file to the current shell session one page at a time.



Note: You cannot use this command to view code image files or configuration files (.img and .cnf extensions).

Command Type

shell

Formats

`more filename`

Examples

This example displays the contents of file `log.txt` one page at a time.

```
[296]more log.txt

Configuration has changed
06:20:11 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06:20:20 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has entered the shell.

06:21:01 060600 Sev=0 Msg:
Configuration has changed
06:21:04 060600 Sev=0 Msg:
Configuration has changed
06:21:04 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06:21:07 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has logged out of the Destination Menu.

04:40:49 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has logged into the Destination Menu.

04:40:51 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has entered the shell.
Press Space for more or q to quit:
```

pad

Description

This command calls an X.25 PAD host. It is used with the X.3, X.28 and X.29 protocols. Used with a link number, it calls the X.25 device connected to that link. Without parameters, it enters the command mode.

Command Types

shell

Formats

pad



Note: There are several parameters available with this command. See the list below.

Parameters

break	Sends a break signal to host.
breakaction	Sets a breakaction.
breakin	Sets a PAD recall character.
call host	Sets up a connection to the named host.
clear	Closes the current connection.
echo	Enables/disables terminal echo.
emask	Sets the terminal echo mask to <i>n</i> .
flow	Enables/disables terminal flow control.
forward	Sets data forwarding conditions.
help	Displays help information.
hosts	Lists all the available hosts.
int	Sends an interrupt packet.
linsert	Sets line feed insertion action.
loghost	Displays X.29 messages.
message	Enables the message mode of operation.
native	Enables the native mode of operation.

pagewait	Sets page wait to <i>n</i> lines.
param	Displays current X.3 parameters.
par	Displays specified X.3 parameters.
printer	Defines terminal as the hardcopy device.
profile	Sets the terminal profile.
quit	Exits the PAD session.
reset	Resets the current call.
rpar?	Displays specified remote X.3 parameters.
rset?	Sets and displays specified remote X.3 parameters.
set	Sets specified X.3 parameters.
set?	Sets and displays specified X.3 parameters.
status	Lists the status of the connection.
transparent	Enables the transparent mode of operation.
vdu	Defines the terminal as a display device.
width	Sets the terminal width to <i>n</i> characters.

Examples

This example displays the enabling of flow control for PAD.

```
[296]pad
PAD: flow
Flow = ON
PAD:
```

This example displays the setting of the PAD profile.

```
[296]pad
PAD: profile
V5
PAD:
```

panic

Description

This command forces AI296 to crash dump and halt.

Command Type

winslc

Formats

wi nsl c baseport pani c

Parameters

baseport Defines the AI296 baseport number.



passwd

Description

This command changes an existing user's password.

Command Type

shell

Formats

passwd



Note: After the initial command is entered, AI296 prompts the user for information needed to configure the new password.

Examples

This example displays the configuration of a new password for existing user `pubs`.

```
[296]passwd
Please enter the login name of the user
whose password is being changed.
pubs
Please enter the OLD password for user 'pubs'.

Please enter the NEW password.
Passwords are truncated at 10 characters.

Please retype NEW password.

Password successfully changed.
[296]
```

ping

Description

This command sends an ICMP echo request to the specified IP address. If the IP device responds to the echo request, a reply receipt message appears. If a reply is not received within 5 seconds, a no reply message appears. This command can be used to troubleshoot network level problems.

Command Types

shell and winslc

Formats

For the shell command:

```
ping ip_address
```

For the winslc command:

```
winslc baseport ping ip_address
```

Parameters

ip_address Defines the IP address of the destination device in dotted decimal format.

baseport Defines the baseport number for AI296.

Examples

This example displays what happens when host 172. 16. 30. 110 replies to a ping.

```
[296] ping 172. 16. 30. 110
Pinging host 172. 16. 30. 110
ICMP Echo Reply: TTL 60
Host 172. 16. 30. 110 replied to the ping
```

The TTL (time-to-live) is the number of jumps or hops the message is allowed to take.

This example displays what happens when no reply is received from host 172. 16. 30. 114.

```
[296] ping 172. 16. 30. 114
Pinging host 172. 16. 30. 114
Host 172. 16. 30. 114 didn't reply to the ping
```

pppstatus

Description

This command displays the status of all ModMux and asynchronous PPP-IPCP links. If IPCP is running on the link (the link status is `RUNNING`), this command also displays the local and remote IP addresses.

Command Type

shell

Formats

pppstatus

Examples

This example displays the status of all PPP-IPCP links.

```
[296] pppstatus
Li nk Phase      Local IP Addr.  Remote IP Addr.
  1: ESTABLISH   N/A            N/A
 14: SERIALCONN N/A            N/A
[296]
```

Column	Description
Li nk	Displays the link number.
Phase	Displays the status of the link. Values are: <ul style="list-style-type: none">● <code>INITIALIZE</code>—Indicates the link is down.● <code>SERIALCONN</code>—Indicates the link is up, but not connected. The link is waiting for the data carrier detect (DCD) signal or the data set ready (DSR) signal to come up.● <code>ESTABLISH</code>—Indicates the link is up, but not connected. The AI296 and the remote device are negotiating basic information on how the connection will operate.● <code>AUTHENTICATE</code>—Indicates the link is up, but not connected. The link is validating ID and password information with the remote device.● <code>NETWORK</code>—Indicates the link is up, but not connected. The link is negotiating the local and remote IP addresses.● <code>RUNNING</code>—Indicates the link is up and connected. IPCP is running on the link. The AI296 and the remote device can transfer IP packets over the link.

Column	Description
Local IP Addr.	Displays one of the following: <ul style="list-style-type: none">● The IP address of AI296 (if the link status is RUNNING)● N/A (if the link status is INITIALIZE, SERIALCONN, ESTABLISH, AUTHENTICATE, OR NETWORK)
Remote IP Addr.	Displays one of the following: <ul style="list-style-type: none">● The IP address of the remote device (if the link status is RUNNING)● N/A (if the link status is INITIALIZE, SERIALCONN, ESTABLISH, AUTHENTICATE, OR NETWORK)

profile

Description

This command allows a user account profile to be customized. The following six system profiles are maintained:

- Supervisor
- Management
- Status
- Empty
- Destination menu
- Connect

Profile names are limited to 19 characters. Only 20 user configurable profiles are allowed to be configured at the same time.

Command Type

shell

Formats

`profile`

- n
- l *profile_name*
- c *existing_profile new_profile*
- a *profile_name* [*commands* [-w]] ...
- d *profile_name* [*commands*] ...
- remove [*profile_name*]

Parameters

- a Adds commands to a profile and optionally adds write permission. The following parameters are accepted:
 - *profile_name*—Defines the name of a user profile.
 - *command*—Defines the name of a command to associate with a user profile.
 - -w—Adds write permission for a command that otherwise would not have write permission.

- c Creates a new profile from an existing user profile. The following parameters are accepted:
 - *existing_profile*—Specifies the name of an existing user profile.
 - *new_profile*—Defines the name of a new user profile.
- d Deletes commands from a profile. The following parameters are accepted:
 - *profile_name*—Defines the name of a user profile.
 - *command*—Defines the name of a command to associate with a user profile.
- l Lists all commands associated with a specific user profile. The following parameter is accepted:
 - profile_name*—Defines the name of a user profile.
- n Lists all user profile names.
- remove Removes a user profile. The following parameter is accepted:
 - profile_name*—Defines the name of a user profile.

Examples

This example displays each of the profile parameter options with associated functionality.

```
[296]profile
Usage: profile -n
       to list profile names
: profile -l <profile name>
       to list all commands associated with a given profile
: profile -c <existing profile name> <new profile name>
       to create a new profile from an existing profile
: profile -a <profile name> [commands [-w]]...
       to add commands to a profile and possibly add write permission
: profile -d <profile name> [commands]...
       to delete commands from a profile
: profile -remove <profile name>
       to completely remove a profile
[296]
```

pvcedit

Description

This command allows a change to occur on a PVC without bringing down (bouncing) the entire link. This command can also be used to reset the PVC without resetting the entire link. If no options are specified, the PVC is simply reset. This command also has the following constraints:

- Only asynchronous and X.25 PVCs are to be used.
- Asynchronous PVCs can be reset only.
- X.25 PVCs can be reset and altered.

Command Types

shell and winslc

Formats

For the AI296 system command:

```
pvcedit t  
    asy.link_number.lcn [ -a call_timer | -c inactivity_timer | -p ]  
    x25.link_number.lcn [ -a call_timer | -c inactivity_timer | -p ]
```

For the winslc command:

```
winslc baseport pvcedit t  
    asy.link_number.lcn [ -a call_timer | -c inactivity_timer | -p ]  
    x25.link_number.lcn [ -a call_timer | -c inactivity_timer | -p ]
```

Parameters

-a	Forces the PVC to activate with the corresponding call timer.
<i>asy.link_number.lcn</i>	Defines the link number and logical channel number for the asynchronous PVC being edited.
<i>baseport</i>	Defines the baseport number for AI296.
-c	Forces the PVC to connect on activity with the corresponding inactivity timer.
<i>call_timer</i>	Defines the value of the call timer. Valid values are from 30 to 600.
<i>inactivity_timer</i>	Defines the value for the inactivity timer. Valid values are from 1 to 600.

- p Forces the PVC to become passive.
- x25. *link_number, lcn* Defines the link number and logical channel number for the X.25 PVC being edited.

Examples

This example displays the call timer set to 32 seconds for PVC x25. 4. 3.

```
[296]pvcedit x25. 4. 3 -a 32  
[296]
```

pvclist

Description

This command lists the PVCs in the system and displays their current state. If there are many PVCs in the system, this command redirects its output to a file named `pvc.lst` for easier viewing.

Command Types

shell and winslc

Formats

For the shell command:

```
pvcl i st [ link_range | * ]
```

For the winslc command:

```
wi nsl c baseport pvcl i st [ link_range ]
```

Parameters

link_range Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1, 4-6 specifies links 1, 4, 5, and 6.

* Specifies all links.

baseport Defines the baseport number for AI296.

Examples

This example displays PVC information for link 1.

```
[296]pvcl i st 1  
[PVC l i st]  
+asy. 1. 1      i t=0      ASD: state=i dl e      muxi d=0      fd=65      fl ags=00a0  
[296]
```

Column	Description
First column	Displays the PVC protocol type, link number, and LCN (logical channel number).

Column	Description
Second column	Displays the timer type for the PVC. Possible values are: <ul style="list-style-type: none"> ● <code>ct</code>—Displays the connect timer if the PVC is active. The number indicates the timer setting in seconds. ● <code>it</code>—Displays the inactivity timer if the PVC is a connect-on-activity PVC. The number indicates the timer setting in seconds. ● <code>Passive</code>—Appears if the PVC is a passive type of PVC.
Third column	Defines the state of the PVC. Possible values are: <ul style="list-style-type: none"> ● <code>idle</code>—Indicates the PVC is ready to connect. ● <code>dataxfer</code>—Indicates the PVC is connected and able to pass data. ● <code>incon</code>—Indicates the PVC is in a transition state. ● <code>attachng</code>—Indicates the PVC is in a transition state. ● <code>not attached</code>—Indicates that the PVC is not connected. ● <code>detached</code>—Indicates the PVC is in a transition state. If the display indicates one of the transition states, this should only appear for a short period of time. If the state remains in this condition, contact Technical Support.
Fourth column	Defines the MuxID, which is an internal number used by developers to describe which data stream is used for the connection.
Fifth column	Defines the file descriptor, which is an integer value used by developers to describe which data stream is used for the connection.
Sixth column	Defines the flag, which gives a code that indicates the purpose of the data stream.



reset

Description

This command resets AI296.



CAUTION: All call processing will stop and all connections will be lost during the reboot process.

Command Type

shell

Formats

reset

Examples

This example displays the resetting of AI296.

```
[296] reset
Are you SURE you want to reset the system? (y/n) y

Resetting system ...
```

rz

Description

This command allows AI296 to receive files from a PC using the Zmodem file transfer protocol. This command can be executed from any asynchronous port or Telnet connection.



Note: After issuing the rz command, if the sending PC does not begin the file transfer within 40 seconds, the system returns to the prompt.

Command Type

shell

Formats

rz

Examples

This example displays AI296 receiving two files from a PC.

```
[296] rz
Ready to receive. Start your upload now.
**B01000400654a92

2 files received.
[296]
```



selcnf



Note: This command is only available for AI296 in standalone mode.

Description

This command has two forms: One allows for the recovery of an overwritten runtime configuration file and the other allows for the deletion of the specified configuration file. Any configuration file (with a .cnf extension) can be used for system boot up. The configuration file is written to boot.ini.

Command Type

shell

Formats

```
sel cnf
  -r
  -d config_file
```

Parameters

- r Specifies the option that recovers the current overwritten run-time configuration file.
- d Specifies the option that deletes a configuration file. The following parameter is accepted:
config_file—Defines a configuration file for deletion; it must end with a .cnf extension.

Examples

This example displays the available options for command `sel cnf`.

```
[296]sel cnf
usage: sel cnf -r
       sel cnf [-d] <config_file>
Selects the specified config file for current configuration.
Options:
  -r           Recovers the current over-written run-time config file
  -d           Deletes the specified configuration file
[296]
```

sholog

Description

This command displays the contents of the log file. The last 32,000 characters of log messages that were sent to the log port are displayed.



Note: This command has the same functionality as command `show l og`.

Command Type

shell

Formats

`shol og -p`

Parameters

`-p` Displays the content of the file one page at a time.



Note: This option is not available with command `show l og`.

Examples

This example displays the contents of an AI296 log file one page at a time.

```
[296]shol og -p

Configuration has changed
06: 20: 11 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06: 20: 20 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has entered the shell.

06: 21: 01 060600 Sev=0 Msg:
Conf igurati on has changed
06: 21: 04 060600 Sev=0 Msg:
Conf igurati on has changed
06: 21: 04 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06: 21: 07 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has logged out of the Destination Menu.

04: 40: 49 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has logged into the Destination Menu.

04: 40: 51 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has entered the shell.
Press Space for more or q to quit:
```

show

Description

This command displays various types of information for AI296.

Command Types

shell and winslc

Formats

For the shell command:

```
show
  comments
  conn
  crash
  data [ link_range | * ]
  eth
  inventory
  ip
  log
  mem
  perf [ link_range | * ]
  ports [ link_range | * ]
  pvc
  router
  tconn
  tcp
  version
  wan
```

For winslc, enter the following command with any of the shell command keywords:

```
winslc baseport show
```

Parameters

- baseport* Defines the baseport number for AI296.
- comments* Displays comments.
- conn* Displays all active connections.
- crash* Displays crash dump information.

data	Displays link data. The following parameters are accepted: <ul style="list-style-type: none">● <i>link_range</i>—Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1,4-6 specifies links 1, 4, 5, and 6.● *—Specifies all links.
date	Displays the date and time.
eth	Displays Ethernet information.
inventory	Displays the serial number, product name, manufacture date, and MAC address (when in standalone mode).
ip	Displays the IP address, subnet mask, and high IP address.
log	Displays the contents of the log file, same as command <code>show log</code> .
mem	Displays memory allocation.
perf	Displays serial link performance. The following parameters are accepted: <ul style="list-style-type: none">● <i>link_range</i>—Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1,4-6 specifies links 1, 4, 5, and 6.● *—Specifies all links.
ports	Displays the link number, link type, and description for all available ports or for a specified range of ports. The following parameters are accepted: <ul style="list-style-type: none">● <i>link_range</i>—Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1,4-6 specifies links 1, 4, 5, and 6.● *—Specifies all links.
pvc	Displays PVC connections.
router	Displays the default and backup gateway IP address.
tconn	Displays complete connections.
tcp	Displays TCP information, such as maximum keepalive tries, dropped SNMP requests, and total opened sockets.
version	Displays the version number of AI296.
wan	Displays WAN diagnostic information.

Examples

This example displays the AI296 version number.

```
[296]show version
Version 96HPC961.000003 created on 2004-07-06 at 09:31:34
Boot Loader Version 96B2L103.000003
[296]
```

This example displays the serial link performance for links 2-5.

```
[296]show perf 2-5

Performance for last 60 seconds:
Intrf  Type  Input Chars/sec  Output Chars/sec
  2    X.25           0             0
  3    X.25           0             0
  4    X.25           0             0
  5    X.25           0             0
[296]
```

This example displays the link numbers, link types, and descriptions for ports 13-16.

```
[296]show ports 13-16

Link Type Description
13: X25
14: X25
15: X25
16: X25
[296]
```

staeia

Description

This command displays the status of the EIA leads.

Command Types

shell and winslc

Formats

For the shell command:

```
staeia { link_range | * }
```

For the winslc command:

```
winslc baseport staeia { link_range | * }
```

Parameters

link_range Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1, 4-6 specifies links 1, 4, 5, and 6.

* Specifies all links.

baseport Defines the baseport of AI296.

Examples

This example displays the status of the EIA leads for links 1 to 5.

```
[296]staeia 1-5
Link Type Status      IN          OUT
      DCD  CTS      DTR  RTS
1: ASY  Enabl ed    -    -      +    +
2: X25  Enabl ed    -    -      +    +
3: X25  Enabl ed    -    -      +    +
4: X25  Enabl ed    -    -      +    +
5: X25  Di sabl ed
[296]
```

Column	Description
DCD	DCD is an incoming EIA lead control signal. The plus symbol (+) indicates that this lead is asserted. The minus symbol (-) indicates that the lead is negated.

Column	Description
CTS	CTS is an incoming EIA lead control signal. The plus symbol (+) indicates that this lead is asserted. The minus symbol (-) indicates that the lead is negated.
DTR	DTR is an outgoing EIA lead control signal. The plus symbol (+) indicates that this lead is asserted. The minus symbol (-) indicates that the lead is negated.
RTS	RTS is an outgoing EIA lead control signal. The plus symbol (+) indicates that this lead is asserted. The minus symbol (-) indicates that the lead is negated.

standalone

Description

This command enables or disables standalone mode. For more information about the difference between standalone mode and switch mode, refer to [Appendix B: Standalone Mode and Switch Mode](#).

Command Type

shell

Formats

```
standalone { true | false }
```

Parameters

true Puts AI296 in standalone mode.

false Takes AI296 out of standalone mode.

Examples

This example displays the current standalone mode status.

```
[296]standalone
Currently forced standalone mode is OFF.
Currently running in switch mode.
[296]
```

This example displays the configuration of standalone mode for AI296.

```
[296]standalone true
[296]
```

staslc

Description

This command displays the status of the links and the DP232 cable.

Command Types

shell and winslc

Formats

For the shell command:

```
staslc { link_range | * }
```

For the winslc command:

```
winslc baseport staslc { link_range | * }
```

Parameters

- link_range* Defines a link or range of links. Valid values are 1 to 32. Individual values are separated by commas (,) and hyphens (-). For example, 1, 4-6 specifies links 1, 4, 5, and 6.
- * Specifies all links.
- baseport* Defines the baseport number for AI296.


Examples

This example displays the link and cable status information for links 1 to 5.

```
[296]staslc 1-5
```

Li nk	Current status	Speed	Act	Pmax	Rx/CRC	Rx/Abt	Rx/Ovr	Tx/Und	Intf
1:	+Asy Link n, 8, 1	9600			0	0	0	0	0 RS-232
2:	+DCE -Dcd -Frm -Pkt	9600	0	128	0	0	0	0	0 RS-232
3:	+DCE -Dcd -Frm -Pkt	9600	0	128	0	0	0	0	0 RS-232
4:	+DCE -Dcd -Frm -Pkt	9600	0	128	0	0	0	0	0 RS-232
5:	-DCE -Dcd -Frm -Pkt	9600	0	128	0	0	0	0	0 RS-232

```
[296]
```

 **Note:** Not all links are displayed here. Entering the command with no additional parameters would show all 16 links.

Column	Description
Li nk	Displays the number of the link.
Status	Displays the link status as <i>dataxfer</i> (data is being transfered), <i>i dl e</i> , or <i>di sabl ed</i> .
Appl .	Displays the application specified for the link (AI i as, Logi n, or Desti nati on).
DTR RTS CTS DSR DCD	Displays the status of the control signals. (+ means the signal is asserted and - means the signal is negated.)
Format	Displays the baud rate, number of data bits, parity (<i>none</i> , <i>odd</i> , or <i>even</i>), and number of stop bits specified for the link.
Pari ty	Displays the number of parity errors.
Frame	Displays the number of framing errors.
Overun	Displays the number of overrun errors.
Underun	Displays the number of underrun errors.

syncflash



Note: This command is only available when AI296 is in standalone mode.

Description

This command synchronizes the AI296 configuration with the configuration information stored on AI198. Enabling this feature ensures that if AI296 is placed in standalone mode, it will operate as it did in switch mode.

Command Type

shell

Formats

```
syncflash { true | false }
```

Parameters

true Enables the update configuration functionality.

false Disables the update configuration functionality.



Note: When running in standalone mode, AI296 always writes to its file system when configuration changes are made. When running in switch mode, the running configuration on AI296 is always kept current with AI198's configuration.

Examples

This example displays the AI296 configuration being synchronized with the configuration information stored on AI198.

```
[296]syncflash true  
[296]
```


SZ

Description

This command sends files from AI296 to a receiving PC using the Zmodem file transfer protocol. This command can be executed from any asynchronous port or Telnet connection.



Note: Before attempting to send files, AI296 sends a signal to the receiving PC. If your emulation program does not support this feature, you may have to start the receiving PC manually.

Command Type

shell

Formats

`sz [filename] ...`

Parameters

filename Specifies the file to send from AI296 to the receiving PC.

Examples

This example displays file `userlog.txt` being sent from AI296 to the receiving PC.

```
[296] sz userlog.txt
Sending files.
**0
1 file sent.
[296]
```

tacacs

Description

This command displays TACACS+ log and shell session information.

Command Type

shell

Formats


```
tacacs
  info
  sholog [ -p ]
  stats [ clear ]
```

Parameters

info Specifies how the current shell session was authenticated. If the current session was authenticated by a TACACS+ server, it will display the IP address of the server. If a TACACS+ server could not be contacted and fallback is enabled, it will display `Fallback to Local`. If TACACS+ authentication was disabled, it will display `Local`.

sholog Displays the contents of the TACACS+ debug log file. The TACACS+ debug log file records all connection attempts to TACACS+ servers. The following information is displayed for each connection attempt:

- A record of the timestamp
- The IP address of TACACS+ server
- The AAA phase
- The success or failure status associated with each connection.

 **Note:** The TACACS+ debug log file is only populated when TACACS+ debugging is enabled using command `debug tacacs on`.

The following parameters are accepted:

`-p`—Paginates the sholog output.

stats Displays or clears TACACS+ specific counters and statistics. The following parameters are accepted:

`clear`—Clears the counters and statistics.

Examples

This example displays the TACACS+ authentication method for this shell connection as Local .

```
[296] tacacs info
Current session authenticated by: Local
[296]
```

This example displays a TACACS+ debug log file.

```
[296] tacacs sholog

[02: 26: 32 030406] 192.168.001.074 AUTHEN FAIL
[02: 26: 32 030406] 192.168.001.089 AUTHEN SUCCESS
[02: 26: 32 030406] 192.168.001.074 AUTHOR FAIL
[02: 26: 32 030406] 192.168.001.089 AUTHOR SUCCESS
```

This example displays all TACACS+ specific counters and statistics.

```
[296] tacacs stats

TACACS+ Statistics
-----
Connect Attempts:           0
Connect Failures:          0

Wrong Header Type:         0
Wrong Header Sequence Number: 0
Wrong Header Session ID:   0
Wrong Body Length:         0

Write Errors:              0
Read Errors:               0
Short Header Received:     0
Short Body Received:       0

Timed-out waiting for response: 0

[296]
```

Display Item	Description
Connect Attempts	Displays the number of attempts that were made to connect to the TACACS+ server.
Connect Failures	Displays the number of failed connection attempts that were made to the TACACS+ server.
Wrong Header Type	Displays the number of packets received from the TACACS+ server that had an invalid type.
Wrong Header Sequence Number	Displays the number of packets received from the TACACS+ server that had a sequence number that was out of order.

Display Item	Description (Continued)
Wrong Header Session ID	Displays the number of packets received from the TACACS+ server that had an invalid session ID.
Wrong Body Length	Displays the number of packets received from the TACACS+ server that had a body length attribute that did not match the actual length of body received.
Write Errors	Displays the number of errors that occurred when AI296 attempted to send a packet to the TACACS+ server.
Read Errors	Displays the number of errors that occurred when AI296 attempted to read a packet from the TACACS+ server.
Short Header Received	Displays the number of incomplete headers that were received when AI296 attempted to read a packet from the TACACS+ server.
Short Body Received	Displays the number of packets with incomplete bodies that were received when AI296 attempted to read them from the TACACS+ server.
Timed-out waiting for response	Displays the number of times AI296 timed out while waiting for a response from the TACACS+ server. For information about configuring the time out value, refer to command aaa on page 9-6 .

tacacs server

Description

This command enables, disables, or removes the configuration for specified TACACS+ servers.

Command Type

shell

Formats

```
config tacacs server
  { server_range | * } { di s a b l e | en a b l e | de f a u l t }
  i p { server_range | * } { i p_a d d r e s s }
  p h a s e { server_range | * } { di s a b l e | en a b l e }
    { a c c o u n t | a l l | a u t h e n | a u t h o r }
  p o r t { server_range | * } { p o r t_n u m b e r }
  s e c r e t { server_range | * } { s h a r e d_s e c r e t }
  s u m m a r y [ server_range | * ]
```

Parameters

*	Specifies all TACACS+ servers.
de f a u l t	Disables all servers in the range and sets all configuration values to their defaults.
di s a b l e	Disables the TACACS+ server or range of TACACS+ servers.
en a b l e	Enables the TACACS+ server or range of TACACS+ servers.
i p	Configures an IP address for specified TACACS+ servers.



Note: AI296 does not prevent users from configuring multiple server entries with the same IP address.

The following parameters are accepted:

- *****—Specifies all TACACS+ servers.
- *server_range*—Specifies a server number or range of server numbers.
- *i p_a d d r e s s*—Defines the server IP address.

phase	<p>Configures the AAA phases that are allowed for specified TACACS+ servers. The following parameters are accepted:</p> <ul style="list-style-type: none">● *—Specifies all TACACS+ servers.● <i>account</i>—Enables or disables the accounting phase for the specified TACACS+ servers.● <i>all</i>—Enables or disables all AAA phases for the specified TACACS+ servers.● <i>authen</i>—Enables or disables the authentication phase for the specified TACACS+ servers.● <i>author</i>—Enables or disables the authorization phase for the specified TACACS+ servers.● <i>disable</i>—Disables the specified AAA phases for the specified TACACS+ servers.● <i>enable</i>—Enables the specified AAA phases for the specified TACACS+ servers.● <i>server_range</i>—Specifies a server number or range of server numbers.
port	<p>Configures the TCP port number for specified TACACS+ servers. The following parameters are accepted:</p> <ul style="list-style-type: none">● *—Specifies all TACACS+ servers.● <i>port_number</i>—Defines the TCP port number for the TACACS+ servers. Valid values are 1 through 65535.● <i>server_range</i>—Specifies a server number or range of server numbers.
secret	<p>Configures the TACACS+ shared secret, which is similar to a password, for specified TACACS+ servers. The following parameters are accepted:</p> <ul style="list-style-type: none">● *—Specifies all TACACS+ servers.● <i>shared_secret</i>—Defines the TACACS+ shared secret for the server or server range. The maximum length of the shared secret is 24 characters.● <i>server_range</i>—Specifies a server number or range of server numbers.
summary	<p>Displays a summary of TACACS+ server configuration settings for specified servers. The following parameters are accepted:</p> <ul style="list-style-type: none">● *—Specifies all TACACS+ servers.● <i>server_range</i>—Specifies a server number or range of server numbers.

server_range Specifies a server number or range of server numbers. The server number represents a server's priority level. AI296 attempts to contact all servers in the range starting with the lowest numbered ones. If the connection to server #1 fails, AI296 will attempt to contact server #2, and so on. Valid values are 1 to 9. Individual values are separated by commas (,) and hyphens (-). For example, 1, 4-6 specifies servers 1, 4, 5, and 6.

Command Defaults

Disabled

Examples

The following TACACS+ server settings are configured for server numbers 1, 4, and 7:

- Enabled TACACS+ servers
- IP address 12.56.120.4
- Disabled accounting phase
- Port number 32500
- Secret newguy.

```
[296] tacacs server 1, 4, 7 enable
[296] tacacs server ip 3 12.56.120.4
[296] tacacs server phase 1-5, 8 disable account
[296] tacacs server port 7-9 32500
[296] tacacs server secret 8 newguy
```

This example displays all configured TACACS+ servers and server settings.

```
[296] tacacs server summary
Server IP Address      Port  Secret                               Phases
-----
+ 1    000.000.000.000      49
- 2    000.000.000.000      49
- 3    012.056.120.004      49
+ 4    012.012.012.012      49
- 5    012.012.012.012      49
- 6    012.012.012.012      49
+ 7    000.000.000.000      32500
- 8    000.000.000.000      32500
- 9    000.000.000.000      32500
newguy Authen Author
Authen Author Account
Authen Author Account

[296]
```

Display Item	Description
Server	Displays the server numbers. The +/- signs indicate if the associated servers are enabled (+) or disabled (-).

Display Item	Description (Continued)
IP Address	Displays the configured TACACS+ IP addresses for the specified TACACS+ servers.
Port	Displays the configured TACACS+ port numbers for the specified TACACS+ servers.
Secret	Displays the TACACS+ shared secrets (passwords) for specified TACACS+ servers.
Phases	Displays the AAA phases that are allowed for specified TACACS+ servers.

tail

Description

This command displays the last few lines of a file.

Command Type

shell

Formats

```
tail [ -n lines ] file_name ...
```



Note: More than one file name can be specified in this command.

Parameters

- `-n` Specifies that a line number value will be entered.
- `lines` Defines the number of lines to display. The default is 20.
- `file_name` Defines the name of the file to display.

Examples

This example displays the last 10 lines of file `userlog.txt`.

```
[296]tail -n 10 userlog.txt
[14: 09: 46 072204] User pubs from 10.40.5.20#1309 has exited the shell.
[14: 14: 50 072204] User pubs from 10.40.5.20#1309 has entered the shell.
[16: 17: 53 072204] User pubs from 10.40.5.20#1309 has exited the shell.
[16: 17: 53 072204] User pubs from 10.40.5.20#1309 has logged out of the Destination Menu.
[16: 27: 23 072204] User pubs from 10.40.5.20#1565 has logged into the Destination Menu.
[16: 27: 25 072204] User pubs from 10.40.5.20#1565 has entered the shell.
[17: 44: 07 072204] User pubs from 10.40.5.20#1565 has exited the shell.
[17: 44: 18 072204] User pubs from 10.40.5.20#1565 has logged out of the Destination Menu.
[09: 15: 28 072304] User pubs from 10.40.5.20#1205 has logged into the Destination Menu.
[09: 15: 29 072304] User pubs from 10.40.5.20#1205 has entered the shell.
[296]
```



tcpoutconn

Description

This command controls how long outgoing TCP connections wait for a connection to be established before failing.

Command Type

shell and winslc

Formats

For the shell command:

```
tcpoutconn [ timeout ]
```

For the winslc command:

```
winslc baseport tcpoutconn [ timeout ]
```

Parameters

timeout Defines the length of the timeout. The range is 2 to 360 seconds. The default is 75.

baseport Defines the baseport number for AI296.



Note: In standalone mode, resetting AI296 resets the timeout to the default of 75.

Examples

This example displays the configuration of the TCP outgoing connection timer to 30 seconds.

```
[296]tcpoutconn 30  
TCP Outgoing Connection Timer Value: 30  
[296]
```

tftp



Note: This command is only available when AI296 is in standalone mode.

Description

This command downloads a file from the Trivial File Transfer Protocol (TFTP) server to AI296 or uploads a file to the TFTP server from AI296.

The following rules apply when uploading or downloading a file:

- File names must contain an extension of .ini, .img, .zmg, .cnf, or .txt.
- Configuration files can be downloaded directly to file primary.cnf or to another .cnf file.
- The only .txt file allowed is banner.txt and the only .ini file allowed is boot.ini.
- AI296 must be updated in order to run a downloaded image file.
- Any .img filename is acceptable except boot.img, which is reserved, and primary_devel.img, which is the primary image.
- All .zmg files must be written to a destination file with a .img extension. If no destination file name is given, the name will default to the source file name with a .img extension.
- The source and destination file names must have the same extension (excluding .zmg files, which use a .img extension).

Command Type

shell

Formats

tftp

```
get [ address ] [ source_filename ] [ dest_filename ]  
put [ address ] [ source_filename ] [ dest_filename ]
```

Parameters

get Downloads a file from the TFTP server. The following parameters are accepted:

- *address*—Defines the IP address of the TFTP server to which the file download will occur.
- *source_filename*—Defines the file to download from the TFTP server.



Note: The source file name cannot contain spaces or special characters.

- *dest_filename*—Defines the name of the source file after it has been downloaded from the server. If no destination file name is specified, the file will have the same name as the source file.



Note: The destination file name cannot contain spaces or special characters.

put Uploads a file to the TFTP server. The following parameters are accepted:

- *address*—Defines the IP address of the TFTP server to which the file upload will occur.
- *source_filename*—Defines the file to upload to the TFTP server.



Note: The source file name cannot contain spaces or special characters.

- *dest_filename*—Defines the name of the source file after it has been uploaded to the server. If no destination file name is specified, the file will have the same name as the source file.



Note: The destination file name cannot contain spaces or special characters.

Examples

This example displays the upload of file `primary.cnf` to file `secondary.cnf` on TFTP server 10.34.6.13.

```
[296] tftp put 10.34.6.13 primary.cnf secondary.cnf
File Uploaded successfully.
```

```
[296]
```

This example displays the download of file `secondary.cnf` to file `primary.cnf` from TFTP server `10.34.6.13`.

```
[296] tftp get 10.34.6.13 secondary.cnf primary.cnf
Attempting to Download the file secondary.cnf ...
File Downloaded successfully.

[296]
```



tftpboot

Description

This command displays the BOOTP/TFTP status or aborts attempts to contact the BOOTP server. The AI296 card attempts to contact a BOOTP server if certain conditions are met. These conditions are:

- The card is in standalone mode.
- AND
- The card does not have an IP address set or no BOOT.INI file exists.

Attempts to contact the BOOTP server continue until a valid reply is received or until the IP address gets set by the user in another manner, such as with an "ip init" shell command.



Note: If the conditions are initially met, then the card will not attempt to contact the BOOTP server.

When AI296 receives the necessary information from the BOOTP server, it attempts to retrieve a configuration file from the TFTP server. The TFTP server information is contained in the response from the BOOTP server.

Command Type

shell

Formats

tftpboot

Examples

This example displays the result of a card booting without a BOOTP/TFTP session.

```
[296]tftpboot
Usage: tftpboot [abort]
Displays B00TP/TFTP status or aborts retry attempts.

B00TP/TFTP di d not run thi s session.
[296]
```

This example displays the result of a card booting when no BOOTP or TFTP server is on the net.

```
[296] tftpboot
Usage: tftpboot [abort]
Displays BOOTP/TFTP status or aborts retry attempts.

Waiting for a response from the BOOTP server.

[296] tftpboot abort
BOOTP/TFTP retry attempts will be aborted.
[296]
```

This example displays the result of a boot when the BOOTP server is on the net but the TFTP server is not available:

```
[296] tftpboot
Usage: tftpboot [abort]
Displays BOOTP/TFTP status or aborts retry attempts.

Waiting for a response from the TFTP server.
BOOTP Response:
  IP Address: 10.48.60.11
  TFTP Server: 10.48.60.1
  TFTP File: 296v950b002.cnf
  Subnet Mask: 255.255.0.0
  Router: 10.48.0.1
[296]
```

This example displays the result of a reboot with a successful BOOTP/TFTP session:

```
[296]tftpboot
Usage: tftpboot [abort]
Displays BOOTP/TFTP status or aborts retry attempts.

BOOTP/TFTP is finished.
[296]
```

timezone



Note: This command is only available when AI296 is in standalone mode.

Description

This command displays or changes the time zone or adjusts the time to reflect daylight savings.

Command Type

shell

Formats

`ti mezone`

`-dstoff [{ + | - } hh: mm]`

`-dston [{ + | - } hh: mm]`

Parameters

- dston** Enables daylight savings time for AI296. The following parameters are accepted:
- **+**—Specifies that the value is east of UTC.
 - **-**—Specifies that the value is west of UTC.
 - **hh**—Defines the number of hours from UTC (Universal Coordinated Time or Greenwich Mean Time).
 - **mm**—Defines the number of minutes from UTC (Universal Coordinated Time or Greenwich Mean Time).
- dstoff** Disables daylight savings time for AI296. The following parameters are accepted:
- **+**—Specifies that the value is east of UTC.
 - **-**—Specifies that the value is west of UTC.
 - **hh**—Defines the number of hours from UTC (Universal Coordinated Time or Greenwich Mean Time).
 - **mm**—Defines the number of minutes from UTC (Universal Coordinated Time or Greenwich Mean Time).



Note: For +/-, enter the direction (+ = east) (- = west) of Universal Coordinated Time (UTC) or Greenwich Mean Time.

The time entered here is the number of hours from UTC. For example, if the desired location is in the Eastern Standard Time (EST) zone, enter -05:00 in this field. This indicates a time 5 hours behind UTC.

Examples

This example displays the current daylight savings time setting.

```
[296]timezone  
Daylight saving is disabled on this system  
Current time zone: +00:00  
[296]
```

This example displays the enabling of daylight savings time and the setting of the timezone to -5:00.

```
[296]timezone -dston  
Daylight saving is enabled on this system  
Current time zone: +00:00  
[296]timezone -05:30  
Daylight saving is enabled on this system  
Current time zone: -05:30  
[296]
```



trace

Description

This command configures which X.25 rejected call codes (cause and diagnostic) appear on the log port. This command can also be used to see the current trace level. The default trace level is 3.

Command Types

shell and winslc

Formats

For the AI296 system command:

```
trace level
```

For the winslc command:

```
winslc baseport trace level
```

Parameters

baseport Defines the baseport number for AI296.

level Defines the minimum trace level on the log port. For example, if *level* is set to 2, all X.25 events assigned a priority of 2 or higher will appear on the log port. The valid range for this argument is 1 to 5. The default level is 3.



Note: If you enter this command without a level, the current trace level number appears.

[Table 9-3](#) shows the priority assigned to each trace level.

Table 9-3 Trace Priority Levels

Priority	Level
X25_TRACE	1
X25_NORMAL	2
X25_MINOR	3 (default)
X25_MAJOR	4
X25_FATAL	5



Examples

This example displays the configuration of trace 2.

```
[296]trace 2  
X.25 Trace Level: 2  
[296]
```

traceroute

Description

This command diagnoses connectivity problems between AI296 and other hosts.

Command Type

shell

Formats

```
traceroute ip_address
```

Parameters

ip_address Defines the IP address of the destination device in dotted decimal format.

Examples

This example displays the traceroute to IP address 10.40.57.10.

```
[296]traceroute 10.40.57.10

traceroute to 10.40.57.10, 10.40.57.10, 30 hops max, 40 byte packets
 1 10.40.57.10
[296]
```

type

Description

This command displays the text of any file other than a code image or configuration file.



Note: This command has the same functionality as command `cat`.

Command Types

shell

Formats

```
type [ -p ] filename
```

Parameters

`-p` Displays text from the file one page at a time.

filename Defines the file for which you want to view the contents.

Examples

This example displays the first page of contents for file `log.txt`.

```
[296]type -p log.txt

Configuration has changed
06: 20: 11 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06: 20: 20 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has entered the shell.

06: 21: 01 060600 Sev=0 Msg:
Configuration has changed
06: 21: 04 060600 Sev=0 Msg:
Configuration has changed
06: 21: 04 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has exited the shell.

06: 21: 07 060600 Sev=F Msg:
User pubs from 10.40.5.20#1436 has logged out of the Destination Menu.

04: 40: 49 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has logged into the Destination Menu.

04: 40: 51 060700 Sev=F Msg:
User pubs from 10.40.5.20#2729 has entered the shell.
Press Space for more or q to quit:
```

update

Description

This command displays information about the image and configuration files. When entered with arguments, this command updates AI296 software. Update the software by copying a new image or configuration file to a destination file.

Command Types

shell and winslc

Formats

For the shell command:

```
update src_file dest_file
```

For the winslc command:


```
winslc baseport update src_file dest_file
```

Parameters

src_file Defines the source file to copy.

dest_file Defines the file where the source file is to be stored.

baseport Defines the baseport number for AI296.

 **Note:** The *src_file* and the *dest_file* must both have a file extension of either .cnf or .img.

Examples

This example displays the update of source image file `296.img` to destination image file `boot.img`.

```
[296]update 296.img boot.img  
[296]
```

uptime

Description

This command displays the current time and the amount of time AI296 has been running since it was last booted.

Command Type

shell

Formats

upti me

Examples

This example displays the current time and the amount of time AI296 has been running since it was last booted.

```
[296]upti me
1: 33pm up 2 days, 23:08:40
(uptime rolls over every 497 days, 2:27:52)
[296]
```



useradd

Description

This command adds a username and password. When the user first logs into AI296, the login name and password are both `ai` by default. Five grace logins are available before a username and password must be configured. A total of ten users can be added to the database.

Command Type

shell

Formats

```
useradd [ -profile_name ] [ username ]
```

Parameters

profile_name Assigns a permission to a username. [Table 9-4](#) describes the permissions. The default permission is `supervi sor`.

username Defines the login name for a user (up to 8 characters). After entering a *username*, a prompt appears that asks for a password (up to 10 characters).

Table 9-4 Description of Permissions

profile_name	Permission
supervi sor	Specifies a user who can execute all commands on the system. At least one supervisor permission must be configured. The system will not allow the deletion of the only supervisor user. The default permission is <code>supervi sor</code> .
mgmt	Specifies a user who can execute all commands except for <code>useradd</code> .

Table 9-4 Description of Permissions (Continued)

profile_name	Permission
status	Specifies a user who can only execute the following commands: <ul style="list-style-type: none"> ● creset ● debug ● di ag-conn ● di ag-i nfo ● di ag-eth ● di ag-tconn ● hel p ● i p ● menu ● pi ng ● pvcl i st ● show ● stae i a ● stasl c
dest	Specifies a user who can login into AI296 and access the destination menu. The user cannot connect to destination ai to retrieve status or to change the configuration.
connect	Specifies a user who is automatically connected to a specific destination at login. The destination is specified when the permission is assigned.

Examples

This example displays the addition of user `bri an` with profile `mgmt` to the user database. The system prompts the user for the password after the username and profile are entered.

```
[296]useradd -mgmt bri an
Adding user of type 'mgmt'
Please enter a password.
Passwords are truncated at 10 characters.

Please retype the password.

User "bri an" added successfully.

[296]
```

userdel

Description

This command deletes a username and password from the database.

Command Type

shell

Formats

userdel

Examples

This example displays the deletion of user `bri an` from the database. After the command is initially entered, prompts appear that tell the user what information needs to be entered.

```
[296]userdel
Please enter the login name of the user to DELETE.
bri an
Delete user "bri an"? (y/n) y
User "bri an" deleted successfully.
[296]
```

users

Description

This command displays currently configured AI296 users with the associated profile names and destinations.

Command Types

shell

Formats

user

Examples

This example displays all currently configured AI296 users with associated profile names and destinations. In this case, `pubs` is the only configured user.

```
[296] users
User Name      Profile Name  Destination
-----
"pubs"        supervi sor
[296]
```



who

Description

This command displays the users currently logged into AI296. It displays the user name, time of login, user ID, the source of the connection, and command currently being used by each user. The destination is shown only if the user has connected to an alias with the destination menu.

Important: Do not use the ID displayed with this command to break a connection.

Command Type

shell

Formats

who

Examples

This example displays all the users currently logged in to the AI296. In this case, pubs is the only logged in user.

```
[296]who
User      Login Time      ID  From      Command (-> Destination)
-----
"pubs"    Jul 23 09:15    76  10.40.5.20#1205  who
[296]
```

XVC

Description

This command displays information about a specific X.25 logical channel.

Command Types

shell and winslc

Formats

For the AI296 system command:

```
xvc link.circuit
```

For the winslc command:

```
winslc baseport xvc link.circuit
```

Parameters

baseport Defines the baseport number for AI296.

link Defines a number from 1 to 16.

circuit Defines a valid, logical channel number.

Examples

This example displays the X.25 logical channel information for link 3 and circuit 1.

```
[296]xvc 3.1
VC state: DataTransfer, link state: L_connected, restarts 1-1 / 0-0
NSUat: 1.
[296]
```



AI296 System Codes

This appendix provides information about AI296 system codes.

Guide to this Appendix

[X.25 Cause Codes and Diagnostic Codes](#)


[Crash Codes](#)

[Kentrox Technical Support](#)

X.25 Cause Codes and Diagnostic Codes

X.25 cause codes indicate events that triggered X.25 packets. Possible values for the cause codes can vary depending on the type of packet (CLEAR REQUEST, REGISTRATION CONFIRMATION, RESET REQUEST, or RESTART).

X.25 diagnostic codes provide additional tips about the nature of a specific problem. Unlike cause codes, diagnostic codes do not vary depending on the type of packet.

 **Note:** Diagnostic codes can be produced by any equipment that handles virtual circuits and can propagate through all equipment that handles virtual circuits. Because of this, diagnostic codes may not indicate a problem with AI296.

The following X.25 cause codes and diagnostic codes are available:

- [Standard Reset Indication Cause Codes](#)
- [Kentrox-Specific Reset Indication Cause Codes](#)
- [Standard Clear Indication Cause Codes](#)
- [Standard ISO Diagnostic Codes](#)
- [CCITT Diagnostic Codes](#)
- [Kentrox-Specific Diagnostic Codes](#)

Standard Reset Indication Cause Codes

Reset indication cause codes apply to reset packets. [Table A-1](#) lists the standard reset indication cause codes (in hexadecimal format) and their meanings.

Table A-1 Standard Reset Indication Cause Codes

Cause Code	Description
0x00	Remote DTE originated reset
0x01	Reset out of order
0X03	Reset due to remote procedure error
0X05	Reset due to local procedure error
0X07	Reset due to network congestion
0X09	Reset due to remote DTE operational
0X0F	Reset due to network operational
0X11	Reset due to incompatible destination

Table A-1 Standard Reset Indication Cause Codes (Continued)

Cause Code	Description
0X1D	Reset due to network out of order

Kentrox-Specific Reset Indication Cause Codes

Reset indication cause codes apply to reset packets and are specific to Kentrox equipment. [Table A-2](#) lists the Kentrox-specific reset indication cause codes (in hexadecimal format) and their meanings.

Table A-2 Kentrox-Specific Reset Indication Cause Codes

Cause Code	Description
0x9B	Remote DTE originated reset

Standard Clear Indication Cause Codes

Clear indication cause codes apply to clear packets. [Table A-3](#) lists the standard clear indication cause codes and their meanings.

Table A-3 Standard Clear Indication Cause Codes

Cause Code	Description
0x00	DTE originated
0x01	Number busy
0x03	Invalid facility request
0x05	Network congestion
0X09	Clear due to network out of order
0x0B	Access barred
0X11	Remote procedure error
0x13	Local procedure error
0x15	Recognized Private Operating Agency (RPOA) out of order
0X19	Reverse charging not subscribed
0X21	Incompatible destination
0X29	Fast select not subscribed

Table A-3 Standard Clear Indication Cause Codes (Continued)

Cause Code	Description
0x39	Ship absent
0x7F	Registration/cancellation confirmed

Standard ISO Diagnostic Codes

[Table A-3](#) lists the standard ISO diagnostic codes and their meanings.

Table A-4 Standard Clear Indication Cause Codes

Cause Code	Description
0xA0	DTE specific signals
0xA1	DTE operational
0xA2	DTE not operational
0xA3	DTE resource constraint
0xA4	Fast select not subscribed
0xA5	Invalid partially full data packet
0xA6	D-bit procedure not supported
0xA7	Registration/cancellation confirmed

CCITT Diagnostic Codes

[Table A-3](#) lists the CCITT diagnostic codes and their meanings.

Table A-5 Standard Clear Indication Cause Codes

Cause Code	Description
0x00	No additional information
0x01	Invalid P(S)
0x02	Invalid P(R)
0x10	Packet type invalid
0x11	Packet type invalid for state r1
0x12	Packet type invalid for state r2

Table A-5 Standard Clear Indication Cause Codes (Continued)

Cause Code	Description
0x13	Packet type invalid for state r3
0x14	Packet type invalid for state p1
0x15	Packet type invalid for state p2
0x16	Packet type invalid for state p3
0x17	Packet type invalid for state p4
0x18	Packet type invalid for state p5
0x19	Packet type invalid for state p6
0x1A	Packet type invalid for state p7
0x1B	Packet type invalid for state d1
0x1C	Packet type invalid for state d2
0x1D	Packet type invalid for state d3
0x20	Packet type not allowed
0x21	Unidentifiable packet
0x22	Call on one-way logical channel
0x23	Invalid packet type on a permanent virtual circuit
0x24	Packet on unassigned logical channel
0x25	Reject not subscribed to
0x26	Packet too short
0x27	Packet too long
0x28	Invalid general format identifier
0x29	Restart or registration packet with non-zero LCN
0x2A	Packet type not compatible with facility
0x2B	Unauthorized interrupt confirmation
0x2C	Unauthorized interrupt
0x2D	Unauthorized reject

Table A-5 Standard Clear Indication Cause Codes (Continued)

Cause Code	Description
0x30	Timer expired
0x31	Timer expired for incoming call
0x32	Timer expired for clear indication
0x33	Timer expired for reset indication
0x34	Timer expired for restart indication
0x40	Call set up, call clearing, or registration problem
0x41	Facility/registration code not allowed
0x42	Facility parameter not allowed
0x43	Invalid called address
0x44	Invalid calling address
0x45	Invalid facility/registration length
0x46	Incoming call barred
0x47	No logical channel available
0x48	Call collision
0x49	Duplicate facility request
0x4A	Non-zero address length
0x4B	Non-zero facility length
0x4C	Facility not provided when expected
0x4D	Invalid CCITT-specified DTE facility
0x50	Miscellaneous
0x51	Improper cause code from DTE
0x52	Not aligned octet
0x53	Inconsistent Q-bit setting



Kentrox-Specific Diagnostic Codes

Kentrox-specific diagnostic codes provide tips about the nature of a specific problem. [Table A-6](#) lists the Kentrox-specific diagnostic codes and their meanings.

Table A-6 Kentrox-specific Diagnostic Codes

Cause Code	Description
0x85	PVC attach error
0x86	Connection listen error
0x87	Not used
0x88	Internal connection ID not found
0x89	Memory resource error

Crash Codes

Crash codes report to the log port when a card crashes and you receive an Alswitch fault message. This message indicates that the system has detected a serious hardware or software fault.

Common Crash Codes

These codes are common to all software (not just Kentrox products). The first column of [Table A-7](#) displays the hexadecimal code for the error message. The second column displays the decimal value for the same message. The third column provides a description of the error message. Contact Kentrox Technical Support to report any of the following crash codes.

Table A-7 Common Crash Codes

Error Code Hexadecimal	Error Code Decimal	Description
0001	1	Specifies a bus error.
0002	2	Specifies an address error.
0003	3	Specifies an illegal instruction.
0004	4	Specifies a zero divide error.
0005	5	Specifies a check instruction trap.
0006	6	Specifies a TRAPV error.
0007	7	Specifies a privilege error.
0008	8	Specifies a trace trap.
0009	9	Specifies an unused exception vector.
09xx	>264	Specifies an illegal vector. xx is the vector number (non-zero) used in place of the codes above to ensure that the exact vector number is determined if an exception occurs.

AI296 Crash Codes

[Table A-8](#) displays crash codes that are specific to AI296. Contact Kentrox Technical Support to report any of the following crash codes.

Table A-8 AI296 Crash Codes

Error Code Hexadecimal	Error Code Decimal	Description
0020	32	Specifies a failure to free resource (streams).
0021	33	Specifies a failure to free memory (system).
0022	34	Specifies a failure of resource allocation (streams).
0023	35	Specifies a failure of memory allocation.
0024	36	Specifies a checksum error.
0025	37	Specifies that a panic message has been printed.
0026	38	Specifies an attempt to boot while up.
0027	39	This code is not used.
0028	40	Specifies that AI296 has been halted by Central Switch command. This code is seen when you enter command <code>stpsl c</code> for a card.
0030	48	Specifies a crash in the shell.
0031	49	Specifies a crash in transport layer multiplexing.
0032	50	Specifies a crash in association daemon.
0033	51	Specifies a crash in bootp.
0034	52	Specifies a crash in X.25.
0035	53	Specifies a crash in an asynchronous driver.
0036	54	Specifies a crash in the PVC daemon.
0037	55	Specifies a crash in the config daemon.
0038	56	Specifies a generic stream error.
0039	57	Specifies a crash in the AEP or AEPN protocol processing option.
003A	58	Specifies a crash in the pktmod or TL1mod protocol processing option.

Table A-8 AI296 Crash Codes (Continued)

Error Code Hexadecimal	Error Code Decimal	Description
00AA	170	Specifies a serious memory error (unable to allocate system memory).
00AC	172	Specifies that a serial communication controller is not responding.
00AD	173	Specifies a software download. This is normal to see when doing a software update to AI296.

System Failure Crash Reports

Crash codes report to the log port when a card crashes and you receive an Alswitch fault message. This message indicates that the system has detected a serious hardware or software fault.

A message similar to the following appears:

```

SLC has CRASHED - registers to follow:
Crash Code= 00000ad
PC= 00000000    SP= 00000000    IMMR= 00000000    MSR= 00000000
GPR00= 00000000    GPR01= 00000000    GRP02= 00000000
GPR03= 00000000    GPR04= 00000000    GRP05= 00000000
GPR06= 00000000    GPR07= 00000000    GRP08= 00000000
GPR09= 00000000    GPR10= 00000000    GRP11= 00000000
GPR12= 00000000    GPR13= 00000000    GRP14= 00000000
GPR15= 00000000    GPR16= 00000000    GRP17= 00000000
GPR18= 00000000    GPR19= 00000000    GRP20= 00000000
GPR21= 00000000    GPR22= 00000000    GRP23= 00000000
GPR24= 00000000    GPR25= 00000000    GRP26= 00000000
GPR27= 00000000    GPR28= 00000000    GRP29= 00000000
GPR30= 00000000    GPR31= 00000000
CR= 00000000    SSR0= 00000000    SSR1= 00000000
LR= 00000000    XER= 00000000    CTR= 00000000
PVR= 00500000    PSOS1=00000000    PSOS2=00000000    PSOS3= 00000000
  
```




Kentrox Technical Support

Some alarm conditions and crash codes reveal serious problems for which you should contact Kentrox Technical Support. If one of these alarm conditions or crashes should occur, record relevant information associated with the problem and contact Kentrox Technical Support.

Phone:

Kentrox Technical Support (866) 480-3571

Kentrox Operator (toll-free) (800) 247-9482

Kentrox Operator (international) (614) 798-2000

Email:

Kentrox Technical Support techsupport@aiinet.com

When you send email to Kentrox, be sure to include your name, company name, and telephone number.



Standalone Mode and Switch Mode

This appendix provides information about standalone and switch mode for AI296.

Guide to this Appendix

[Standalone Mode](#)

[Switch Mode](#)

Standalone Mode

Standalone mode refers to the mode where AI296 stores its configuration locally (to flash) or on a TFTP server. The CLC might be used as the TFTP server in some cases. This lets the card operate as a self-contained unit. When operating in standalone mode, AI296 has a local menu system that is used instead of the AI198 menu system for tasks such as alias and IP configuration. AI296 operates in standalone mode when it is installed in the AI110 chassis.

The following characteristics apply when AI296 is operating in standalone mode:

- The front panel Ethernet port is the default (rather than the IRB).
- AI296 cards are not hot-swappable—the card configuration must be set up manually.
- AI296 has a unique system OID.
- The AI296 local menu system has slightly different options than when the card is running in switch mode.

Downloading Software for a Standalone AI296

To download software for AI296 in standalone mode:

1. Open a command prompt window.
2. At the command prompt, start the FTP utility:

```
ftp
```

3. At the FTP prompt, open AI296:

```
open ip_address
```

ip_address Specifies the AI296 IP address.

The FTP utility prompts you for a user name and password.

4. Put the FTP utility in binary mode:

```
binary
```

5. Transfer the software image to AI296:

```
put filepath/imagename.img
```

filepath Defines the path to the software image file.

imagename Defines the software image file name.



Note: Wait for a completion message after entering this command.

6. Exit the FTP utility.
7. Login to the shell with a serial or Telnet connection.
8. Update the existing boot program image with the new software image file:

```
update imagename.img boot.img
```

imagename Defines the software image file name.

9. When the update is complete, reboot AI296.

Configuring BOOTP/TFTP

The AI296 configuration can be automatically downloaded from a TFTP server when the card is in standalone mode and has BOOTP information stored in AI198 Menu 10. For more information about BOOTP configuration, refer to “Configuring the BOOTP Table” in the *AI198 Common Logic Controller System Manager/User's Manual*.

When AI296 starts, it determines if the following conditions are met before using BOOTP to find IP address information:

- AI296 is in standalone mode
- The IP address is not set.

If both of these conditions are met, AI296 attempts to contact a BOOTP server until it obtains valid IP address information or the IP address is set by a user with the `ip init` shell command. When an IP address has been obtained either by BOOTP or through the [ip init](#) command, AI296 will resume its boot process.

The following events occur when AI296 attempts to download a configuration file from the TFTP server:

- Once the IP address information has been correctly configured from the BOOTP reply, AI296 will attempt to contact a TFTP server only if the TFTP server IP address and configuration filename were received by the BOOTP reply.
- AI296 will try to download the configuration file from the TFTP server once every 60 seconds for a maximum of 10 retries.
- If no valid configuration file is downloaded from the TFTP server after 10 retries, AI296 will remove the previously configured IP address information from the BOOTP server and completely restart the BOOTP process.
- If at any time the local configuration file stored on flash is changed by a user, AI296 will stop attempting to contact the TFTP server.
- If a valid configuration is successfully downloaded from the TFTP server, AI296 will update the current configuration with the downloaded file.

Switch Mode

Switch mode refers to the mode where AI296 is managed by the CLC. When AI296 is in switch mode, the AI198 menu system must be used to configure IP addresses, aliases, IP static routes, and SNMP traps. AI296 must be located in the AI130 or AI180 chassis to operate in switch mode.

The following characteristics apply when AI296 is operating in switch mode:

- AI296 gets its configuration from the CLC at boot time (instead of locally or by TFTP).
- The CLC is used to route calls and maintain alias configuration information.
- The IRB is the default port (rather than the front panel Ethernet port).
- AI296 cards are hot-swappable—the card configuration does not have to be set up manually.
- The banner must be less than 1024 characters.



Note: Switch mode may also be referred to as CLC mode.

Downloading Software for AI296 in Switch Mode

To download software for AI296 when it is in switch mode:

1. Open a command prompt window.
2. At the command prompt, start the FTP utility:

```
ftp
```

3. At the FTP prompt, open AI198:

```
open ip_address
```

ip_address Specifies the AI198 IP address.

The FTP utility prompts you for a user name and password.

4. Put the FTP utility in binary mode:

```
binary
```

5. Transfer the software image to AI198:

```
put filepath/imagename.img
```

filepath Defines the path to the software image file.

imagename Defines the software image file name.



Note: Wait for a completion message after entering this command.

6. Exit the FTP utility.
7. Log in to AI198.
8. At the command prompt, update AI296 with the new software image:

```
winsl c baseport update
```

baseport Defines the baseport of AI296.



Note: You can watch the download process by entering CTRL+L.

9. Wait for the completion message.



Commands for AI296 TACACS+ Server Enhancements

This appendix provides a list of commands that users need when configuring a TACACS+ server to utilize AI296's authorization enhancements.

Guide to this Appendix

[AI296 Commands](#)

[AI296 Menu Aliases](#)

[FTP Sessions](#)



AI296 Commands

Important: To authorize a command with no additional arguments, remember to enter `permi t ^$` in the argument list.

The following AI296 commands can be included in an authorization set on the TACACS+ server:

2401	pvcl i st
aaa	queue
ai	i p
al arm	l i nk
arp	l og
break	l ogout
cat	l s
cl ear	reset
crash	rm
crc	sel cnf
cretset	shol og
date	show
debug	snmp
del	i d
del ete	soni c
di ag-conn	stae i a
di ag-eth	standal one
di ag-i nfo	stasl c
di ag-l i ne	syncfl ash
di ag-tconn	tacacs
di r	tai l
exi t	task
head	tcpoutconn
hel p	tftp
memory	tftpboot
memtrack	ti mezone
menu	type
modmux	update
more	upti me
passwd	useradd
pi ng	userdel
pppstatus	users
profi l e	who

The following keyword lets users access destinations:

dest Provides authorization at the destination menu. Individual destination names can be used as arguments. For example, `{permi t AI , permi t somedesti nation, permi t EXIT}`.

AI296 Menu Aliases

The following AI296 menu aliases can be included in an authorization set on the TACACS+ server. Authorization occurs when level 1 menu items are traversed:

<code>menu</code>	Provides access to the menu.
<code>menu_al i as</code>	Provides read access to the Alias menu.
<code>menu_al i as wri te</code>	Provides write access to the Alias menu.
<code>menu_l i nk</code>	Provides read access to the Link menu.
<code>menu_l i nk wri te</code>	Provides write access to the Link menu.
<code>menu_i px</code>	Provides read access to the IP Over X.25 Subnet menu.
<code>menu_i px wri te</code>	Provides write access to the IP Over X.25 Subnet menu.
<code>menu_route</code>	Provides read access to the Static route menu.
<code>menu_route wri te</code>	Provides write access to the Static route menu.
<code>menu_system</code>	Provides read access to the System menu.
<code>menu_system wri te</code>	Provides write access to the System menu.



Note: Keyword `wri te` is treated as an argument.

FTP Sessions

The following AI296 keywords apply to FTP access:

ftpl ogi n Provides FTP read access.

ftpwri te Provides FTP write access.